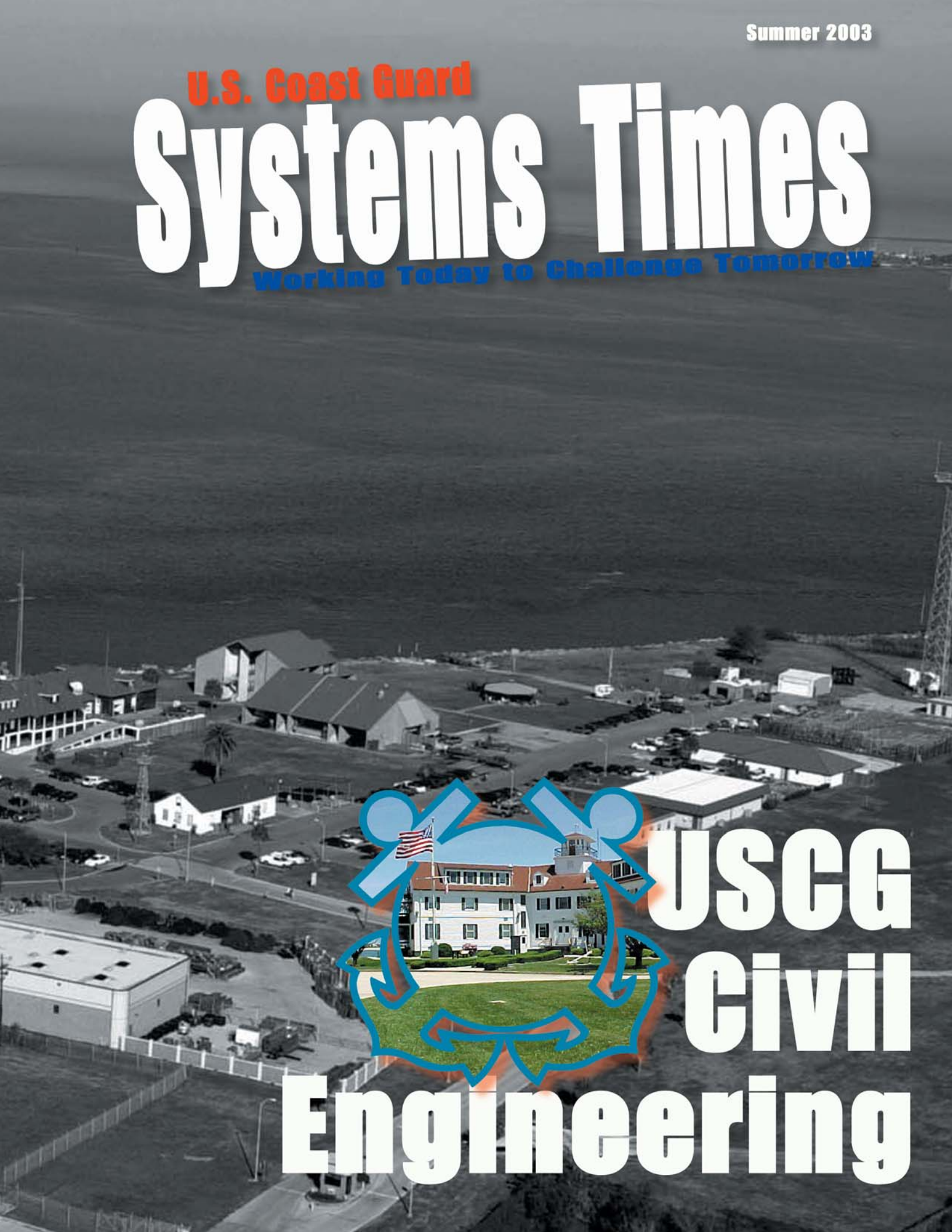
Summer 2003

U.S. Coast Guard

Systems Times

Working Today to Challenge Tomorrow



USCG Civil Engineering

Summer 2003, Vol. 7, No.26

Systems Times

U. S. Coast Guard
Systems Times

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The U.S. Coast Guard Systems Times is published quarterly by the Assistant Commandant for Systems. This publication is unofficial and not authority for action. Views and opinions expressed are not necessarily those of the U.S. Department of Homeland Security or the U.S. Coast Guard. We encourage readers to submit articles and letters to the editor. Authors are encouraged to submit articles through the Program Representative. The Systems Times Editor and the Systems Directorate Management Board retain final approval authority for the publication or non-publication of all article submissions. We will make every effort to publish all submissions. We also reserve the right to edit submissions for length, accuracy and grammar. All letters to the editor must be signed along with current address and telephone number.

Article and Photo Submissions:

Articles should be about 500 words long; however, C4 and engineering specific articles can be up to 2,000 words. To have your article considered for publication, photo(s) must accompany each article. Articles can be submitted by FedEx in hard copy and/or in Microsoft Word on a 3.5 disk or e-mailed electronically. Please submit original photographs and graphics. All slides, photos, graphics and illustrations should be in color where possible. Let us know if you want your photos and graphics returned to you. Submit inquiries, letters, articles and photographs to:

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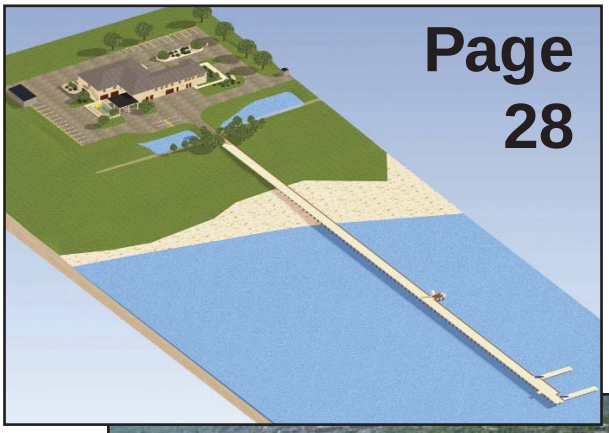
Summer 2004 - 03 April 2004

Front and Back Covers: Coast Guard Group Galveston. (USCG photo by PA2 James Dillard)

What's Inside?



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As this issue of the *Systems Times* is being distributed, I will be retiring from the Coast Guard after 36 years of active duty service. It comes as no surprise that the past year as the Coast Guard's Chief Engineer has gone by quickly, but it's remarkable that the 36 years also passed by as rapidly. During my career, I had the good fortune and opportunity to become involved in many projects and programs that I could not have imagined as an Ensign.

Foremost among these is the opportunity to cap my career among the hard-working, dedicated men and women of Systems and our Headquarters units. I am awed and inspired by the scope of initiatives we encounter and your ability to stay focused on customer needs. Your focus is most commendable given the uncertain, formidable, often conflicting, always urgent, environment we work in.

Today's issue will be the first of several with a "Focus on Facilities." With the exception of our human resources, no other segment of our portfolio of assets is as diverse nor is asked to do as much as our shore facilities. Our shore portfolio is in large part an accumulation of assets inherited from our predecessor agencies and "free" opportunities acquired from the Department of Defense restructurings. Just this January, the largest of these properties, Governors Island (GI), was transferred to the city and state of New York after 35 years of Coast Guard stewardship.

Like many of our facilities, GI required far too much in operation and maintenance costs and capital improvements to remain an affordable part of our inventory. Like our cutter, boat, aircraft, and Command, Control, Communications, Computer, Intelligence, Surveillance and Reconnaissance (C4ISR) assets, Governors Island's infrastructure faced block obsolescence. Unlike those assets

there is no standardized, technology driven, modernization mandate. The fight to make our shore facilities code compliant, energy efficient, earthquake and hurricane resistant, modern, functional, aesthetically pleasing, and secure is fought one project at a time.

You will note as you read through the facilities' articles, Governors Island condition was unfortunately not unique not in the Coast Guard; nor is it unique in Federal government. The General Accounting Office released a report in January of this year that found Federal Real Property to be at High Risk. Areas of concern are declared high risk when they present major management challenges and risks to program (mission) accomplishment. Many of our own assets are in an alarming state of deterioration. Restoration and repair needs are rapidly approaching $1 billion dollars. Even with adequate maintenance funding, regular recapitalization is necessary to meet emerging missions, improve conditions and extend useful life.

The Civil Engineering program is currently working on a comprehensive, integrated transformation strategy for real property. This initiative requires the development of new tools that are discussed in the articles, in this and subsequent issues. It also requires engagement with the Office of Management and Budget (OMB), the General Services Administration (GSA) and other Department of Homeland Security (DHS) Bureaus. I hope you will find this work interesting and timely to keep our shore assets viable.

For many of you, this is my last opportunity to address you. On behalf of Susie and myself, thank you for your service and for the support and friendship you have shown us over a terrific career. To the members of the technical community who feel, correctly, that you are in the "Perfect Storm" of management and organizational changes -- DHS personnel changes, Federal Activities Inventory Reform (FAIR) Act, A76 competitive sourcing, Acquisition, Construction & Improvement (AC&I) personnel caps, Theater Integrated Logistics Architecture (TILA) implementation, IDS, Rescue 21, new units, personnel growth, etc. ... hang in there. Every generation faces uncertainty and new challenges. In future years, I'm confident that you will be able to look back with justified pride that you not only survived them, but the Coast Guard and our country is the better for them because you made them work.

It's been a privilege and an honor.

James A. Kinghorn, RADM, USCG
Assistant Commandant for Systems
“Chief Engineer”

Editors Note: Rear Admiral Kinghorn assumed his current position as Assistant Commandant for Systems, Coast Guard Headquarters, in June 2002. He is responsible for all Engineering (Civil, Naval, Aeronautical, Electronics), Logistics, and Command, Control, Communications and Computers in the Coast Guard's capital plant, with a replacement value of $27.5 billion. This includes over 200 aircraft, 250 ships, 1,400 boats and 10,000 structures.

RADM Erroll M. Brown will assume the position of Assistant Commandant for Systems in June of 2003.

Command Center Recapitalization Project (CCRP) (C2CEN)

The Command Center Recapitalization Project (CCRP) is beginning GCCS-J installations at all Coast Guard Districts, Area and Section Command Centers. The first installation will be at the 14th District on 7 April 2003. Installations will continue throughout the spring and will be completed by mid-summer. The GCCS Support Facility in Honolulu, will install and provide support for the GCCS software. GCCS Operator training will be provided during the installation.

The CCRP is also in the process of submitting a statement of work to install Video Display Systems (VDS) in all District, Area and Section Command Centers. These Video Walls will consist of four 50" panels. They will accept multiple video and computer inputs and the images will be completely scalable across the entire wall. Command Centers that desire a larger wall will be able to combine funds with USCG Command and Control Engineering Center (C2CEN) to increase the number of panels. VDS installations are expected to begin this summer. The CCRP Point of Contact is LCDR Amy Kritz at (757) 686-4287.

Vessel Monitoring System (VMS) (C2CEN)

USCG Command and Control Engineering Center (C2CEN) is getting ready to test and deploy the CG Vessel Monitoring System. The National Oceanic and Atmospheric Administration (NOAA) has begun providing test track data and the data feed from NOAA Headquarters has been successfully tested. The CG system will replicate the track data from NOAA using Oracle replication, reconfigure the data, and then send the pertinent information to the District and Area Command Centers for display on Command and Control Personal Computer (C2PC). The information will include overlays of the targeted fishery's boundaries.

Future phases of the project will include sending the track information directly to the operational platforms, for identification and prosecution of actual targets. Point of Contact is Ms. Jean Wyllie at (757) 686-4250.

Nationwide/Maritime Differential Global Positioning System (N/DGPS) (C2CEN)

The Nationwide Differential GPS (NDGPS) expansion project continues to increase signal coverage throughout the U.S. Twenty-four NDGPS sites are now on air supplementing the existing maritime DGPS sites for a total of 81 transmitting broadcast sites. Recently, the Medora, North Dakota, U.S. Air Force Ground Wave Emergency Network (GWEN) site was converted to NDGPS operations. A new construction site in Angleton, Texas, replacing the Galveston, Texas site, was recently completed. The upcoming months will show the same steady progress, as additional sites are brought on-air. These sites include new site construction in Pahoa, Hawaii; and GWEN conversions at Lincoln, California; Bakersfield, California; Hackleburg, Alabama; Austin, Nevada; and Kensington, South Carolina. The Kensington site will replace the Charleston, South Carolina maritime DGPS site and the Lincoln site will replace the Point Blunt, California maritime DGPS site. The Appleton, Washington site will be modernized to standard configuration this summer as well. The proposed Fiscal Year 2003 (FY03) NDGPS predicted coverage map is shown in Figure 1 with single coverage areas in gray and double coverage areas in yellow (see next page).

The USCG Command and Control Engineering Center (C2CEN) continues to work with equipment manufacturers and field units to implement several recently issued Field Changes (FCs) to improve the overall availability and

reliability of the NDGPS service. These FCs include: FC11, which improves the maritime antenna system; FC12, which upgrades the DGPS reference station power supply; FC13, which improves the firmware of the DGPS reference station and integrity monitor to better track satellite performance and reduce the effect of satellite anomalies; FC14/15, which upgrades the DGPS automatic tuning unit; FC16, which is nearing completion, converts the Wide Area Network (WAN) services from an X.25 protocol to a Frame Relay protocol. Two additional FCs are soon to follow. Field Change 17 will standardize the monitoring system for all CGF-C2-1216-DGPS (V)1, (V)2 configured sites. Field Change 18 will introduce the RTCI (Remote Transmitter Control Interface) which will allow for NCS control of the RCA Transmitters installed at CGF-C2-1216-DGPS (V)3 configured sites and standardize the monitoring system similar to FC17.

C2CEN continues to improve the NDGPS infrastructure with additional engineering projects including, but not limited to: extensive studies on determining future capabilities of the next generation DGPS system; fully inclusive MF radiator, ground, icing, and lightning protection studies to determine the ideal DGPS antenna configuration; and a SC1000 battery charger upgrade. NDGPS Point of Contact is Mr. Dave Wolfe at (757) 686-4015.

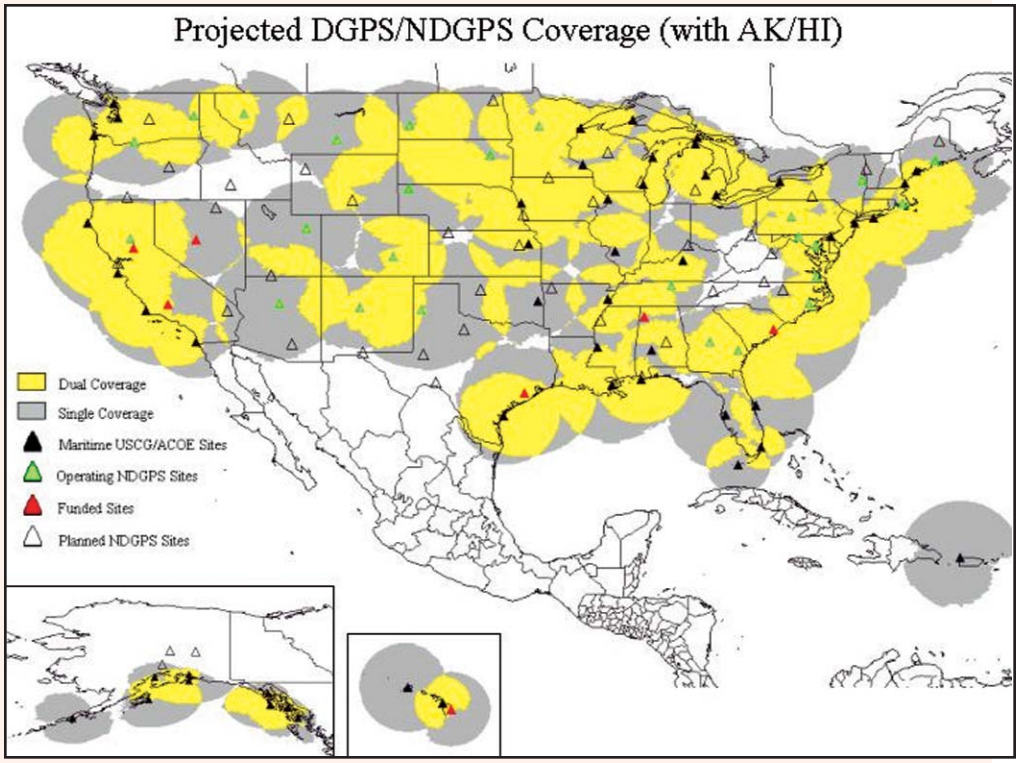


Figure 1. FY2003 PREDICTED NDGPS COVERAGE (Courtesy USCG NAVCEN).

Short Range Aids to Navigation (SRAN) (C2CEN)

ACMS (Aid Control and Monitor System) Replacement Project:
The Office of Electronic Systems (G-SCE) sponsored a $1,250,000 AFC-42 (Allotment Fund Control Code) project in August 2002 to replace all ACMS Master Units (MU), Transfer Units (TU), Remote Units (RU) and Low Energy Remote Units (LERU) with a Commercial-off-the-Shelf (COTS) hardware and software system. The project is divided into two parts: (1) MU Procurement: All current ACMS units with the Aquanta or Winsystem MU will be replaced with a Pentium IV Windows XP unit. This purchase will occur regardless of the second part. (2) TU, RU and LERU hardware and ACMS system soft-

ware: Research, solicit and buy a COTS ACMS system that operates a standard RU to replace all current RU, TU and LERU units currently installed. The software system will be installed on the MU purchased in the first portion of the contract.

The USCG Command and Control Engineering Center (C2CEN) is currently testing and evaluating a Remote Unit (RU) supplied by Tideland Signal Corporation under a Bailment Agreement. Solicitation for the equipment will occur early in the third quarter of Fiscal Year 2003 (FY03). C2CEN will not award a total contract without reliable test proof at a Beta site. There is a fallback option if a COTS product is not available by building a government system based on the current Range Light Controller Computer architecture. Field installations for the new ACMS systems are projected to begin in FY04 and will be accomplished using contractor personnel.

VM100 Fog Detectors:

The USCG Command and Control Engineering Center (C2CEN) has developed two Field Changes (FCs) to correct the laundry list of problems with the VM100 Fog Detectors. Field Change 3 was issued in February 2002, and FC5 was issued in August 2002 (FC4 addressed grounding problems at field installations). As of March 2003, the status of VM100 field change accomplishment by the Engineering Logistics Center (ELC) Baltimore is as follows:

FC3 Installed	FC5 Installed	FCs 3&5 Installed
47 out of 300 (16%)	89 out of 300 (30%)	64 out of 300 (21%)

The plan is for ELC Baltimore to install FC3 and FC5 into VM-100s already in stock. These are shipped out to replace VM-100s in the field. The VM-100s removed from the field are returned to the ELC. ELC upgrades the returned VM-100s with FC3 and FC5 to make them available for future installations to replace the VideoGraph Bs still in service. ELC has been completing the field changes at the rate of about 16 units per month. This means it will take approximately 9 to 12 months to complete the remainder of the VM100s.

The good news is that reports from the field so far, indicate that FC3 and FC5 appear to have corrected the reliability problems with the VM-100. All were in agreement that the moratorium on new VM-100 installations could be lifted at any time. However, there are not enough upgraded VM-100s currently available to resume installations, and this won't change for the next several months.

As a side note, ELC advises that the VideoGraph Bs are still fully supportable with plenty of spares still in stock.

Range Light Controller:

The USCG Command and Control Engineering Center (C2CEN) is in the final testing stages of a new Range Light Controller (RLC). The RLC is a system that autonomously synchronizes and controls range lights. This project will allow more control of shipping channels when appropriate. A baseline unit was demonstrated that controlled day and night lights. The unit also controlled a test bed of high and low power xenon daylights. At present, there is only one planned installation -- Elk River. Future installations beyond

that are yet to be determined by HQ.

SRAN Point of Contact is Mr. Mike Zemaitis, C2CEN, (757) 686-2153.

Vessel Traffic System (VTS) (C2CEN)

The USCG Command and Control Engineering Center (C2CEN) supports the Vessel Traffic Systems located in New York, Houston/Galveston, San Francisco and Puget Sound. Current efforts have focused on upgrading radar remote sites to a Personal Computer (PC) -based radar processor. These upgrades were coupled with a software upgrade to provide enhanced radar control, tracking and tuning. Other efforts include developing an Automatic Identification System (AIS) interface to provide VTSs with precise tracking of vessels equipped with transponders. AIS is under current development and is planned for field installation this summer. C2CEN is working closely with G-AVT (Vessel Traffic Service Project) and the Port and Waterways Safety System (PAWSS) contractor in planning for the transition to the replacement VTS system. Two ports are scheduled for transition to PAWSS starting in 2004. VTS Point of Contact LT Randy Navarro at (757) 686-4237.

Electronic Charting System (ECS) (C2CEN)

Field Change 1 for the new Opto-Isolators for all 49' BUSL (Stern Loading Buoy Boat) units has been released and can be found on the USCG Command and Control Engineering Center (C2CEN) website: http://cgweb.lant.uscg.mil/c2cen/fc.htm#capn

C2CEN is currently testing two Electronic Charting Systems (ECS): ICE and Computer Automated Practical Navigation (CAPN) Mosaic. Integrated Charting Engine (ICE) was developed by the Space and Naval Warfare System (SPAWAR) and is deployed on eight 110' Patrol Boats for testing. Installation includes a Hewlett Packard (HP) Pentium 4 laptop with 512MB of RAM as a replacement of the Micron SWIII (Standard Workstation III) in order to meet the minimum requirements of the product. ICE provides a soft real-time graphical display of ownship position and surrounding area. ICE also provides an integrated layered tool set to support various missions in harmony with primary navigation operations. ICE displays National Imagery and Mapping Agency (NIMA) Digital Nautical Charts (DNC®), utilizes GEOSYM 4 Symbology and allows the user to exploit the functionality inherent in DNC to meet Electronic Chart Display and Information System (ECDIS) standards defined by the International Maritime Organization (IMO) and/or International Hydrographic Organization (IHO). Several CAP'N users are testing a new product call The Capn Voyager Mosaic Version 7.2. It is currently installed for testing on four cutters and at C2CEN. CAP'N Mosaic provides increased functionality including access to NIMA DNC® Charts, plus many new DNC® specific features. ECS Point of Contact is LT Chris Jensen at (757) 686-4280.

Tender Deployable DGPS System (CG/PSN-1) (C2CEN)

CG/PSN-1 systems are fielded aboard Coast Guard Cutter (CGC) KUKUI in Hawaii, CGC SPAR in Alaska and CGC SASSAFRAS in Guam. The USCG Command and Control Engineering Center (C2CEN) is actively engaged in an effort to improve the system's VHF datalink and technical documentation. Engineers have identified a more robust VHF datalink system manufactured by Teledesign Systems Inc. The improved datalink hardware not only outperforms the previously fielded modems, but it also offers a much more user-friendly software interface for configuration. System engineers are developing a Statement of Work to have a technical writer improve the system's technical manual and documentation. Future plans include field support of the

system, completion of the cutter navigation interfacing study, and development of a computer based training program. C2CEN Point Of Contact is LT Parsons at (757) 686-4076.

First Lift In OAK RIDGE (Yard)

The Yard completed the first scheduled lift of a Coast Guard cutter in the OAK RIDGE on 25 March 2003. Acquired by the Yard in February 2002 and after undergoing a year of preparation, the ex-Navy dry-dock successfully lifted the Cutter GALLATIN. The Charleston, South Carolina based 378' cutter was visiting the Yard for a 13 week routine repair availability. OAK RIDGE, the U.S. Navy's first medium class auxiliary dry-dock, served with distinction in World War II. The dry-dock will increase the Yard's future repair capacity and will be instrumental in the Yard's ability to maintain fleet readiness.

USCGC GALLATIN in dry dock aboard the OAK RIDGE.

Barque EAGLE Completes Yard Availability (Yard)

The Yard completed a five month availability on the Coast Guard Barque EAGLE when the cutter departed on 22 March 2003. Major jobs accomplished included: overhaul of the missenmast and bow sprint; extensive habitability improvements; and underwater body hull inspection. EAGLE held an Open House on Sunday, March 16th for employees, families and guests of the Baltimore Area Coast Guard Commands. The Commanding Officer and crew of the EAGLE extended appreciation for the support and expertise afforded during the Yard repair period. Over 500 guests came to say farewell to the famous tall ship.

The Yard's 100th Lift! (Yard)

The Coast Guard Cutter MARIA BRAY became the Yard's 100th lift on the land based ship handling facility on Friday, 5 March 2003. From such high profile visitors as the Barque EAGLE and the Cutter DALLAS to smaller class cutters

such as 87' and 110' patrol boats, the Yard's shiplift has cradled these vessels over the past six years and allowed the Yard to service the Coast Guard fleet. The Cutter NUNIVAK was the first Coast Guard platform dry-docked on the shiplift on 16 October 1997. Three weeks later on 10 November 1997, the land based ship handling facility formally opened with the ceremonial lift of the then homeport Cutter RED BIRCH. The CGC MARIA BRAY was in the Yard for a 12 week routine repair availability that included the installation of new hydraulic chain stoppers, boom inspections and a prototype sonar system installation.

USCGC MARIA BRAY

Yard Works On National Historic Landmark (Yard)

The decommissioned Coast Guard Cutter TANEY, now a national historic landmark owned and operated by the Baltimore Maritime Museum, arrived at the

Yard for an eight week availability during the first week of March 2003. The TANEY was last dry-docked 20 years ago. Tops on the Yard's job list was preservation of the cutter's underwater body. Decommissioned in 1986, the 67 year old Cutter TANEY is the only warship afloat today that provided defense during the 7 December 1941 attack on Pearl Harbor which began the Second World War.

Yard Attains ISO 9001:2000 Quality Management System Standards (Yard)

On 22-24 January 2003, the Yard was audited by the American Bureau of Shipping (ABS) on the ISO 900l: 2000 Quality Management System. This was the Yard's transition audit to the new quality standards. The Yard successfully completed the audit with four minor open issues. The ABS Audit Team specifically commented that the Yard's transition audit results were amongst the best they had seen from any of the companies they had audited to the new standard. The auditors also stated that interviews with both senior and junior Yard tradesmen demonstrated their exceptional commitment to delivering a quality product.

Yard Wins 2002 DOT Environmental Achievement Award (Yard)

The Coast Guard Yard is a winner of the 2002 Department of Transportation Environmental Achievement Award in the environmental management systems category. Continued certification to the ISO 14001 standard has validated the Yard's Environmental Management System thereby insuring the effectiveness of the Yard to continually improve its environmental performance. Winners of the award competition were announced on 16 January 2003.

Yard Completes Hangar Installation On CGC ALEX HALEY (Yard)

One of the largest road teams ever assembled to accomplish a dockside availability, the Yard's ALEX HALEY road show departed Baltimore with 26 members in the fall of 2002 and headed for San Pedro, California, to meet the renowned Coast Guard Cutter ALEX HALEY. The trip completed installation of the Cutter's helo hangar that houses an HH-60J helicopter. For most of the Yard tradesmen, traveling to meet the Alaska based Cutter was like coming home. The Yard accomplished the successful ALEX HALEY conversion from a Navy salvage and rescue ship in 1999.

USCGC ALEX HALEY.

Yard Provides Hull Sustainment To 110' Patrol Boats (Yard)

The Coast Guard Cutter FARALLON departed the Yard on 7 December 2002 after completing a nine-month prototype Hull Sustainment Project (HSP). Approximately 30-40% of its hull and support structure below the main deck was repaired/replaced. FARALLON was the first 110' to undergo this process. Throughout the winter, spring and summer of 2003, the Yard accomplished HSP on the Cutters CUSHING, CHINCOTEAGUE, SAPELLO and DRUMMOND. The goal of the HSP is to eliminate hull corrosion and add another ten years of service life to each craft.

Vessel Logistics System (VLS) Defined (G-SL)

The term Vessel Logistics System is being used more frequently, however, it can be a source of confusion for many people who have not heard it used, or described for them, before. VLS is not a system, but an "encompassing term" used to refer to that collection of systems or applications used to provide vessel logistics information management capability. Presently VLS consists of the Fleet Logistics System (FLS), Configuration Management Plus (CMPlus), the ELC/YARD system known as Supply Center Computer Replacement (SCCR), the Automated Requisition Management System (ARMS) and the Naval Engineering Technical Information Management System (NE-TIMS). Two other non-logistics systems, which are closely tied to VLS and provide procurement and financial management support, are the Large Unit Financial System (LUFS) and the Contract Information Management System (CIMS).

Fleet Logistics System (FLS) (G-SL)

The FLS Acquisition Project Office (G-AFL) "stood down" early last summer, but work to complete FLS has continued within the office of Logistics Information (G-SLI). In January, of 2003, FLS Version 2.0 was fielded, which completes the Maintenance Management requirements of FLS. Efforts are continuing to incorporate all Preventive Maintenance Systems (PMSs) into FLS under this version by migrating legacy PMS data. At the time of this writing, FLS 2.1, which contains enhanced provisioning functionality for the Engineering Logistics Center (ELC), is being readied for testing. Development work on FLS 3.0, which incorporates electronics systems management functionality and provides links to technical information in the Naval Engineering Technical Information Management System (NE-TIMS), is just being completed and a transition plan from the Accountable Item Management (AIM) system to FLS is being prepared in conjunction with the Office of Electronic Systems (G-SCE). FLS 4.0, which involves the "composite application" interface to Large Unit Financial System (LUFS) and Contract Information Management System (CIMS), is presently in testing. FLS 4.0 will likely not be deployed until early Fiscal Year 2004 (FY04), due to dependencies on the 5.0 Standard Image and to minimize disruption at the end of the FY. One of the key capabilities of FLS is to store and manage unit configuration data originally deployed under the Configuration Management Plus (CMPlus) project. This process is underway, but the large data management load and configuration management learning curve is causing progress to be slow.

CMPlus (G-SL)

Users of CMPlus "sounded off" with their displeasure of the CMPlus user interface when over 750 responded to our Front End Analysis (FEA) survey fielded though the Performance Technology Center at Petaluma. This feedback came as no surprise, as CMPlus is still saddled with the original sliding-menu interface from its origins as a CGSW II (Coast Guard Standard Workstation II) CTOS application. As this *System Times* issue hits the streets, CMPlus 5.0 will be deployed by the Configuration Management

Implementation Team (CMIT) and the Maintenance and Logistics Command (MLC) Assist Teams. CMPlus 5.0 is the long-awaited Graphical User Interface (GUI) upgrade to CMPlus. While most core functionality remains in tact, CMPlus 5.0 also includes enhanced functionality for communicating with FLS, including the ability to attach files to a Current Ships Maintenance Program (CSMP) submission and to automatically send smaller "CMDIS" extracts to FLS for regular configuration data exchange.

Supply Center Computer Replacement (SCCR) (G-SL)

Configuration Management Plus (CMPlus) is not the only application undergoing a facelift. Like CMPlus, the SCCR user interface was constructed at a time when Coast Guard Standard Workstation II (CGSW II) was still on the desktops of most Engineering Logistics Command (ELC) and YARD employees. A Graphical User Interface (GUI) upgrade is presently underway at Operations Systems Center (OSC) Martinsburg, West Virginia and will be tested and fielded in increments through September, 2003, at which point the full conversion will be complete.

Accountable Item Management (AIM) Retired (G-SL)

Transition to Vessel Logistics System (VLS) Underway - By the time this issue is published, the Accountable Item Management (AIM) system will be retired from Coast Guard service. When AIM development began in G-ELM in 1994 (old Office of Engineering Logistics), the objective of the system was to consolidate three functional stovepipes into a single system. The three systems AIM was to replace were the Electronics Equipment Information System (EEIS), the Standard Workstation Inventory Management (SWIM) system and the Personal Property Accountability (PPA) system. SWIM pulled out of the AIM effort before it was ever fielded, and property management eventually migrated to Oracle Fixed Assets, leaving only the electronics community to be served by AIM. Over the last two years, the Office of Logistics Information (G-SLI) and the Office of Electronic Systems (G-SCE) have partnered to develop a vision of electronics system supply chain management based on VLS. Transition to VLS-centered support will be gradual, occurring over the course of the next year, and largely dependent on the deployment of FLS 3.0 and CMPlus 5.0. G-SCE and G-SLI have developed an interim management approach, with supporting Access-based software, to make the transition possible.

Vessel Logistics System (VLS) Decision Support Software (G-SL)

The current standard Decision Support Software used by the VLS applications is COGNOS. COGNOS is a web based reporting tool, and is used by other programs such as CGINFO, Readiness Management System (RMS) and Aviation Logistics Management Information System (ALMIS). The Chief Information Officer's (CIO) office sponsors an enterprise software license for COGNOS. The Logistics Information (G-SLI) office is currently using two of the COGNOS products, Impromptu Web Reports (IWR) and COGNOS Query (CQ). Later this year we plan to use COGNOS's Powerplay tool for producing information "cubes."

COGNOS IWR are canned reports created in response to user requirements. There are over 300 COGNOS IWR reports currently posted on the web. Still more are being developed to support the VLS community. COGNOS Query is an ad hoc reporting tool and, due to license restrictions and training required, is limited to a select number of users. Query users must have some knowledge of the database in order to navigate through the tables

to obtain the needed data. COGNOS Powerplay is another ad hoc reporting tool that allows the user to pick and choose what they want displayed on a report using tabs and tables stored in cubes. Impromptu Web Reports and Query use real time production data while the cubes use data that is accurate to the last data refresh, usually done once per day or week, depending on the application.

G-SLI has been working with the Office of Naval Engineering (G-SEN) to integrate operational data with VLS Casualty Report (CASREP) data. The COGNOS architect tool seamlessly connects the VLS data with the Abstract of Operations System (AOPS) data, linking the Cutter's operational schedule to CASREP occurrences on critical systems.

G-SLI has also been working the Request Mobilization Subsystem (RMS) staff to provide data sources for their materiel readiness measures. Readiness metrics are identified and calculated using COGNOS functions and are captured and displayed via cubes that point to several databases. They will be using VLS CASREP data to determine a cutters state of readiness.

ELC Warehouse (ELC)

The USCG Engineering Logistics Center (ELC) is currently engaged in a $12.6M warehouse consolidation project. Our primary warehouse at Curtis Bay, Maryland has been demolished and the new 131,400 square foot warehouse and administration building will hold inventory and personnel currently located at three separate locations.

The project consists of three phases. Phase one began in January 2002 by moving inventory parts and our shipping and receiving operations to temporary locations. These relocations facilitated the beginning of phase two which included the demolition of several buildings and the construction of the new office/lab facility. We moved into the new office/lab building during the period of 24 April 2003 - 15 May 2003. Now that this office/lab move is complete, more demolition and construction will follow with an anticipated occupancy of the new warehouse beginning on 1 October 2003. Phase three will then coordinate the relocation of approximately 36,000 line items of material from our various storage facilities to the new Curtis Bay warehouse.

The new ELC warehouse under construction.

Configuration Management

"What the heck is it?"

by Shelley Diedrich
Office of Logistics Information (G-SLI)

Not only do we wonder what the heck it is, but also, what the heck does Configuration Management (CM) have to do with me? A CM Natural Working Group (CMNWG) was stood up in September of 2001 to answer these and other CM related questions. The group, comprised of members from Headquarters (G-D, G-A, G-SLP, -SLS, -SCC, -SCE, -SEA, -SEN, -AWL, -SLI, G-CIT), ELC, MLCLANT, MLCPAC, C2CEN, LSU, TISCOM and ARSC, unanimously agree on one thing -- the need for an effective CM program. "The absence of CM and/or ineffective configuration management has cost the USCG operational delays to systems/equipment mismatches with support assets, increased costs due to unanticipated changes, and degraded operational availability. This reduces the USCG's ability to perform its mandated missions. The USCG does not have well defined or enforceable business practices, which identify, manage, control, document and verify system configurations or subsequent changes to those systems. USCG configuration management policy is not followed due to a lack of understanding, no incentive and lack of training in the importance of CM." (CMNWG Problem statement -- debrief to Guidance Team 30 July 2002).

So what the heck is CM? CM is the backbone, the skeleton in which all core business processes depend. CM is a discipline, a discipline that provides a means for **documenting** and **controlling engineering designs** so **required operational capabilities** can be **achieved** and **sustained**. **It** is a process for establishing and **maintaining consistency** of a **products performance**, functional and physical attributes **with its requirements, design** and **operational information throughout its life**. CM kept simple results in many benefits to the CG, reduces maintenance, promotes clear understanding of critical components and processes, compliance with operational requirements, control resources expended on changes, increased quality and increased system availability. Everyone within the organization is responsible for CM. The majority of CM responsibility lies with the support infrastructure in HQs,

HQ commands and Maintenance and Logistics Commands, which are responsible for the configuration item identification, configuration control, status accounting activities and configuration audits. Operational units are responsible for only making unauthorized changes when absolutely necessary and reporting these changes ASAP; continuous monitoring of equipment/system with its technical documentation i.e., nameplate data to tech manual and the reporting of discrepancies. ☞

The CM NWG has been striving to update USCG CM policy and processes that can be implemented to identify, manage, control, document and verify USCG systems configurations throughout their life cycle. In July of 2002 the group completed phase 1, which was the analysis of the CG's current CM policies, processes and information systems, synthesizing the desired state of CG CM and identification of gaps between the two states. The following table lists the gaps identified by the group.

CM Policy	CM Processes	CM Information Systems
Organizational Compliance	Organizational knowledge of the principles of CM	Status Accounting
Education	Data Verification	Change development and processing
Awareness	Periodic Audits	Data Management
Standard/Centralized guidance	Responsibility	Data integrity
Non-responsive ECP process	Fragmented Sustainment Organization	Standardized Business Process
CM chain of command	Standardized Guidance	
Enforcement	Handbook	
Clear & Concise Direction		
Requirements Identification Process (Non-major Acquisition)		
Institutionalized verification process		
Defined CM responsibilities		
Accountability		

In summary, CM is not: institutionalized/centralized, measured, enforced and understood both at HQs and in the field. Factors contributing to this situation are: decentralization of support chain and funding; non-standard processes; extensive burden on the operational units; undefined roles and responsibilities; non-existent CM training/education; fragmented sustainment organization; and lack of standardized data management. Whoooo!!

The group has spent the last eight months focusing on the above areas, our accomplishments to date include: (l) identification of EIA 649/MIL-STD-973 as USCG core CM guidance; (2) development of a USCG CM handbook based on MIL-HDBK-61A/B; (3) identification and selection of a CM training course; (4) securing the funds for the first USCG course; (5) completion of CM training outline for the organization; (6) CM awareness, ALCOAST on importance of CM, CM advisories, *Systems Times* Article; (7) initiation of a CM web site; (8) piloted an automated CCB process known as MEARS; and (9) identification of CM status accounting requirements. This is only the beginning, we have just begun to tackle this problem and welcome any and all suggestions.

CM is undergoing a renaissance within the Coast Guard and we predict tremendous benefits to our organization will be realized with your assistance. ST

Civil Engineering

by Ed Tupay, P.E.
Office of Civil Engineering (G-SEC)

Program Desired Competencies

People are one of the three pillars of the Commandant's Direction. Just as the Coast Guard relies on its people to provide services to the American public, the Civil Engineering (CE) Program relies on its people to provide service to the Coast Guard. As with any service organization we must ensure that our people have the right competencies to optimize service delivery in support of the other two pillars, Readiness and Stewardship.

CE Program personnel have traditionally viewed their role as that of planners, designers, constructors and maintainers of shore facilities. Prior to the creation of the Maintenance and Logistics Command (MLC), civil engineering offices were in each district office with staffs comprised solely of engineers, architects and technicians. The advent of the MLC and the creation of the Civil Engineering Units brought contracting and real property specialties under the civil engineering umbrella. As the public became more environmentally conscious, the Coast Guard responded by developing competencies in environmental management and energy efficiencies. With the increasingly important role of information technology, the CE Program has embraced using technology, adding Information Technology (IT) support personnel and providing our people with the competencies to use those tools. The Shore Facility Capital Asset Management (SFCAM) initiative has expanded our responsibilities and shifted our role to become asset managers as we embrace the entire life cycle of our shore portfolio (planning, investing, using and divesting). The current threat climate has recently caused the program to focus on Anti-Terrorist/Force Protection skills and competencies.

Over the last several years, the CE Program has been transitioning from a traditional plan-design-build organization to a capital asset management organization. This transition is partly in response to internal Coast Guard driven strategies as well as government wide trends to create

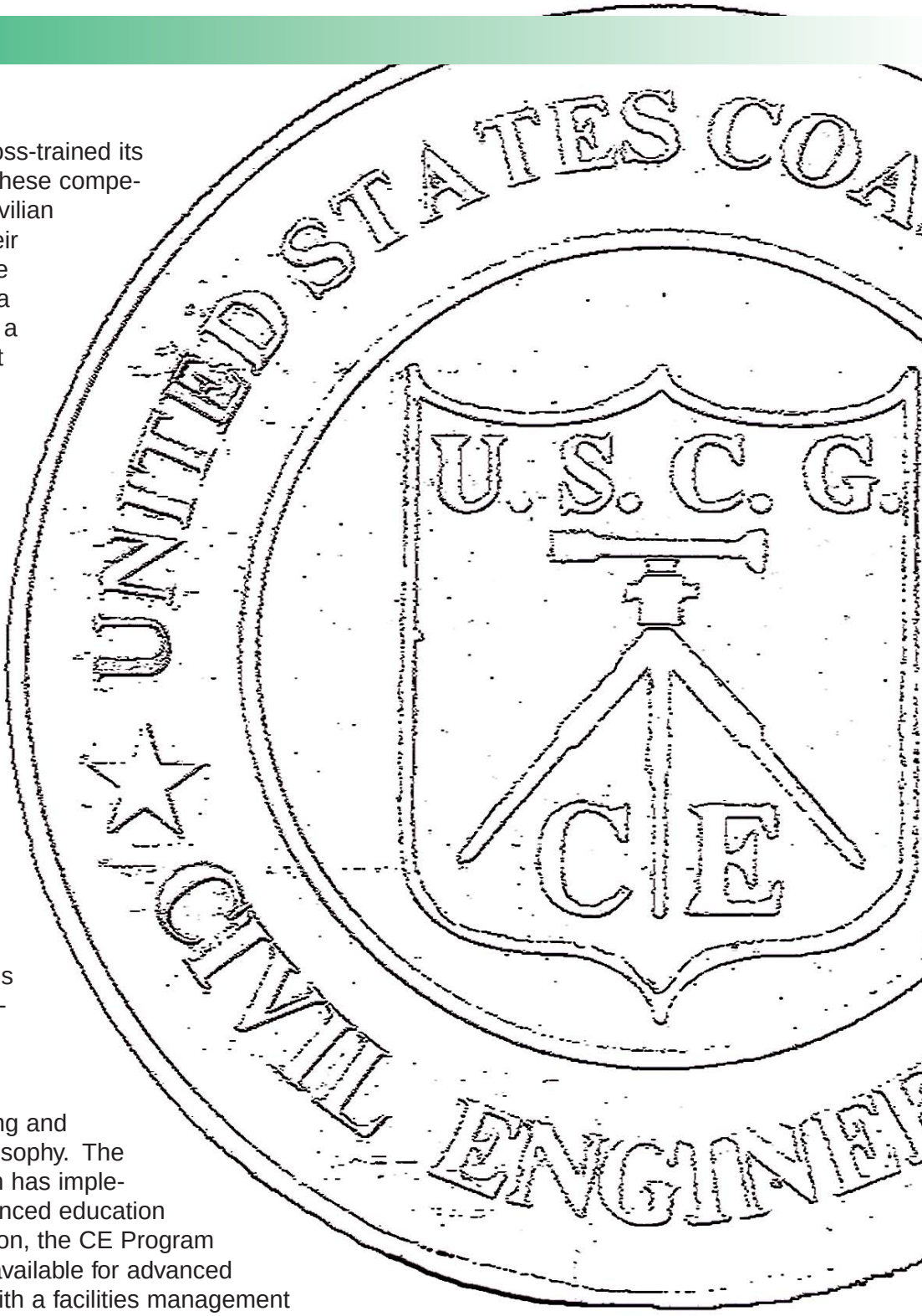
Table 1

Area	Competency
Operations and Maintenance	Oversee acquisition, installation, operation, maintenance and disposition of building systems.
	Manage the maintenance of building structures and permanent interiors.
	Oversee acquisition, installation, operation, maintenance and disposal of furniture and equipment.
	Oversee acquisition, installation, operation, maintenance and disposition of grounds and exterior elements.
Real Estate	Manage real estate assets and transactions.
	Manage the real estate portions of the planning process.
Human and Environmental Factors	Develop and implement practices that promote and protect health, safety, security, the quality of work life, the environment and organizational effectiveness.
	Develop and manage emergency preparedness procedures.
Planning and Project Management	Develop and design facility plans.
	Plan and manage all phases of projects.
	Manage programming and design.
	Manage construction and relocations.
Facility Function	Plan and organize the facility function.
	Manage personnel assigned to the facility function.
	Administer the facility function.
	Manage the delivery of facility services.
Finance	Manage the finances of the facility function.
Quality Assessment and Innovation	Manage the process of assessing the quality of services and the facility's effectiveness.
	Manage the benchmarking process.
	Manage the audit activities.
	Manage developmental efforts of facility services to make innovative improvements in facilities and facility services.
Communication	Communicate effectively.

organizations that better manage assets in support of stewardship of the public's trust. The Coast Guard is also wrestling with some very weighty issues such as the Theater Integrated Logistics Architecture (TILA) implementation and the Federal Activities Inventory Reform (FAIR) Act competitions. Implementation of TILA requires that we put the right competencies in place at the right levels in the organization to support operational and logistical outcomes. The FAIR Act requires that the competencies that we provide be inherently governmental. These forces make the embrace of a broadened set of competencies even more imperative.

Table 1 shows the competencies and sub competencies that the CE Program is advocating for their personnel. Most, if not all of them currently reside within the program. They do so, however, in highly specialized stovepipes. As asset managers, our people need a broader set of skills to handle the challenges of managing facilities through their entire life cycle.

The Coast Guard has always cross-trained its military officers across many of these competency areas while allowing the civilian workforce to specialize within their respective area of expertise. The changing environment supports a change from this status quo. As a model to imitate, the Department of Defense has developed the Facilities Engineering career field. This has allowed personnel to broaden their competencies across the spectrum listed above in response to the challenges facing their organization. The concept of cross training, job expansion and job enrichment is not new. It benefits both the employee and employer in several ways. It provides the employer with an employee that can do more for the organization, allowing flexibility of work assignments, and provides the employee with increased personal satisfaction. The employee gains a wider skills base and opportunities for a variety of work experiences which results in increased satisfaction.



We are working to provide training and education in support of this philosophy. The CE Post Graduate (PG) Program has implemented a joint MSCE/MBA advanced education program for its officers. In addition, the CE Program has made more school options available for advanced education opportunities, many with a facilities management focus. PG officers are now required to pursue research while at school to familiarize themselves with state of the art on capital asset management and/or facility management practices and acquaint themselves with the leaders in the industry. There are also opportunities to pursue additional education and training through off duty tuition assistance and Class C training. Many course offerings are available from the Building Owners and Managers Institute, the International Facilities Management Association, Association of Facilities Engineers, and others that align with these desired competencies.

The CE Program will continue to focus on developing the right competencies for its employees and will pursue the development of the new Facilities Engineering career field. It is right for the organization and right for our people as we support readiness and foster stewardship in the 21st century. ST

Introduction

The First Coast Guard District's geographical boundaries stretch from northern New Jersey all the way up the Atlantic Coast to the Canadian border. It is home to some of the oldest facilities in the Coast Guard's shore facilities inventory. Some of the remaining original stations and lighthouses here in the First District were constructed around the same time that the Revenue Cutter Service was formed. Many of the more "recent" facilities were constructed during the boom that accompanied and followed World War II. Civil Engineering Unit Providence, located in Warwick, Rhode Island, has responsibility for managing all capital assets (buildings, structures, towers, waterfronts, aids to navigation, etc.) located within the First District. A common structural element found in several First District waterfront facilities is a timber bulkhead or wave screen designed to block incoming waves and provide a calm mooring basin for Coast Guard small boats and the floating docks to which they moor. The six locations within the First District that include a timber wave screen are shown in Figure 1.

Timber Wave Screen De

by LCDR William Smith
Civil Engineering Unit Providence

Figure 1. Timber wave screen locations in the First District.

The design-build contract to construct new boatlift piers in Southwest Harbor, Maine includes a timber wave screen. Conflicts with the general contractor during the fall of 2002 highlighted some of the problems that can result when civil engineers that are unfamiliar with wave mechanics try to design structures subject to wave-induced forces. Additionally, an apparent "hole" in existing coastal engineering design methodology was discovered, which limits the design options for replacement of some existing First District wave screens that are rapidly approaching the end of their life span. What follows is a brief description of wave mechanics, timber wave screens, the design problem encountered at Southwest Harbor, and plans for future work on the issue of timber wave screen design.

Basic Wave-Wall interaction

Although individual element dimensions vary, Figure 2 (next page) shows a typical timber wave screen attached to a pile-supported pier. Incoming waves are shown on the left side of the figure, denoted by the label H_i. Although waves are seen on the surface of the water, their influence extends downwards into the water below for quite some depth. Using water pressure or current sensors, researchers have determined that large waves will cause water perturbation at depths up to 65 feet (20 meters). The depth to which a wave's influence penetrates depends on the wavelength. The water depth at most Coast Guard facilities is shallow enough that it can be assumed that the large design waves will affect the water column all the way to the bottom. When an

esign and Repair Issues

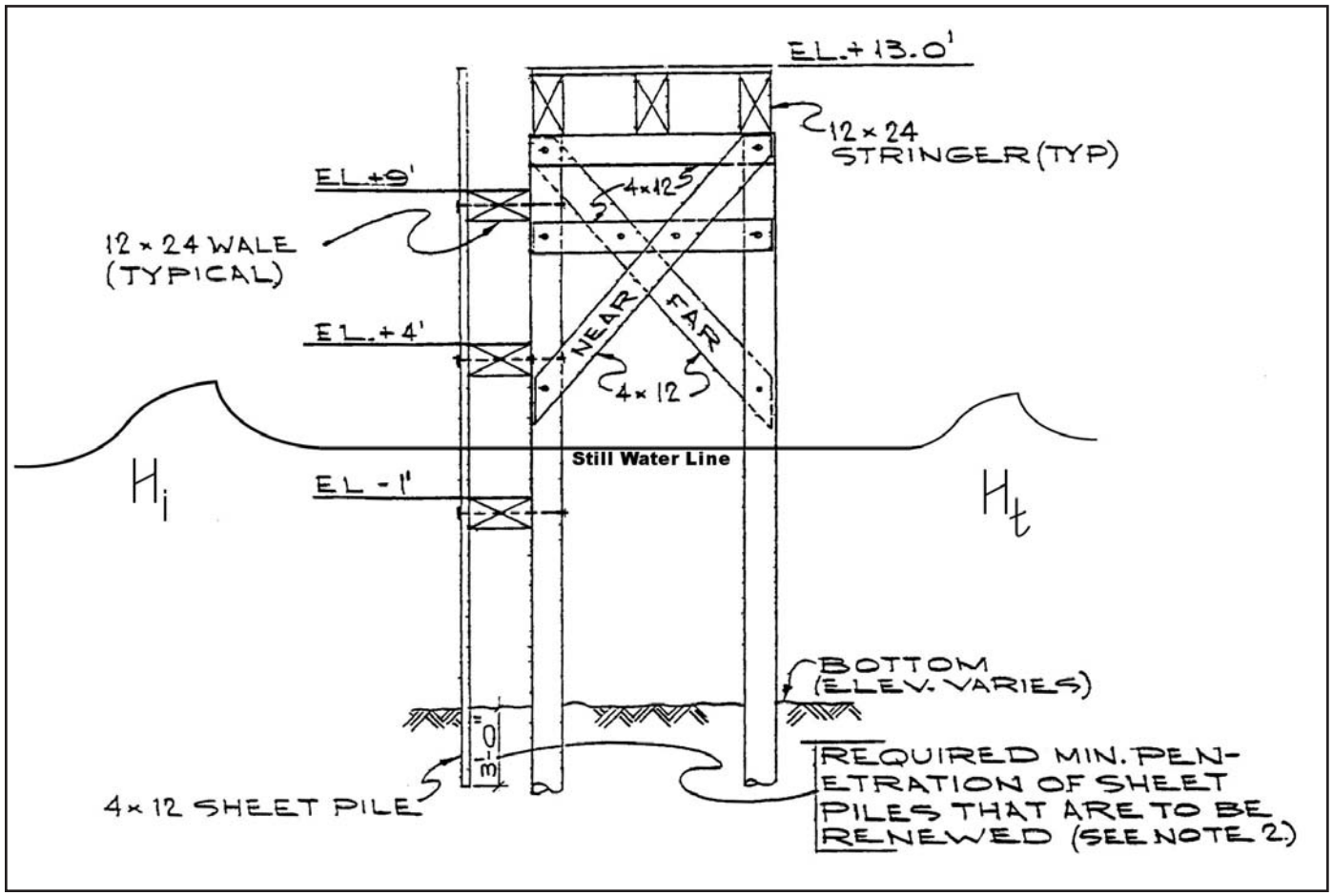


Figure 2. Typical wave screen section showing incoming (H_i) and transmitted (H_t) waves.

incoming wave encounters a wall, such as that formed by the 4x12 timber sheet piles shown in Figure 2, a number of things can happen. If the wall is solid, e.g., no spaces between the boards, it extends all the way to the bottom (as shown in Figure 2), and the wall is sufficiently long (relative to the width of the wave) then the wave is reflected back the way it came, and there is no wave transmission into the basin. In such a case, the transmitted wave height, H_t, would equal zero. However, if there is open space between the wave boards, wave energy will pass through the wall and the transmitted wave height H_t will be larger than zero. The transmitted wave height H_t and incident wave height H_i are related as follows:

Equation 1 $$\mathcal{H}_t = \mathcal{K}_t \bullet \mathcal{H}_i$$

Over the years several researchers including Grüne et al. (1974) and Kriebel (1993) have investigated the effects of the size of the space between boards in a timber wave screen on the wave transmission coefficient, K_t. Both found that the transmission coefficient was highly dependent on the space between the boards, relative to the centerline spacing of the boards, as shown in Figure 3 (next page).

Kriebel defined the wall porosity as:

$$\mathcal{P} = \frac{s}{b}$$ **Equation 2**

His results from laboratory experiments showed that for waves with low "steepness" e.g., waves with a height roughly equal or less than one-tenth of the water depth, the transmission coefficient could be as high as 70 or 80 percent for wave screens with porosities as low as 0.l5 to 0.25. To keep the transmission coefficient below 50%, porosity of 0.1 or less was needed. For a wave screen constructed of 4x12 timbers, this means that the distance between the boards cannot exceed 1 1/3 inches.

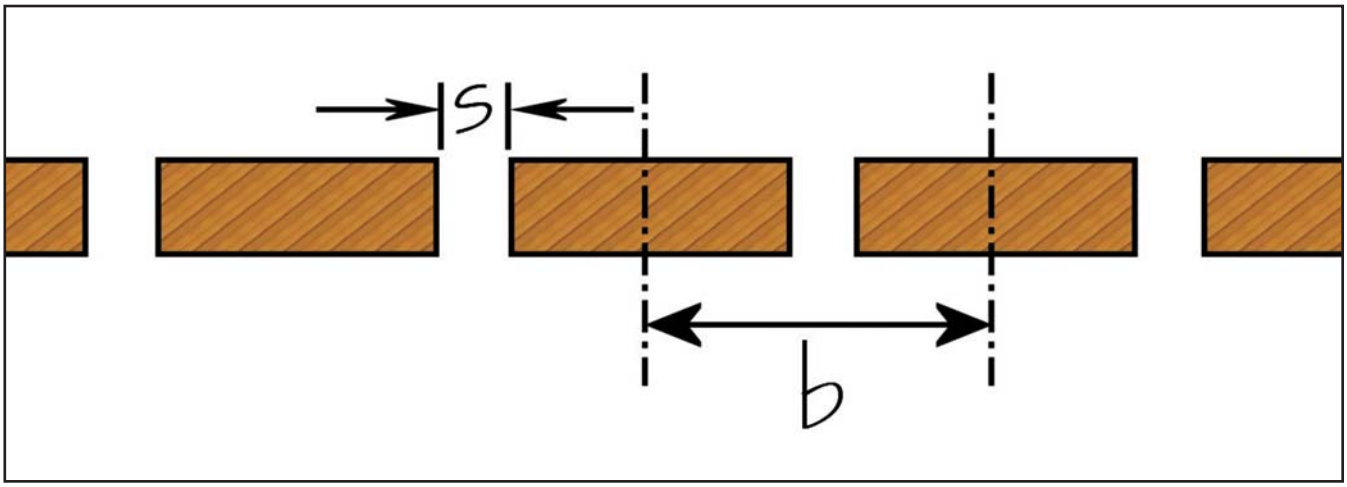
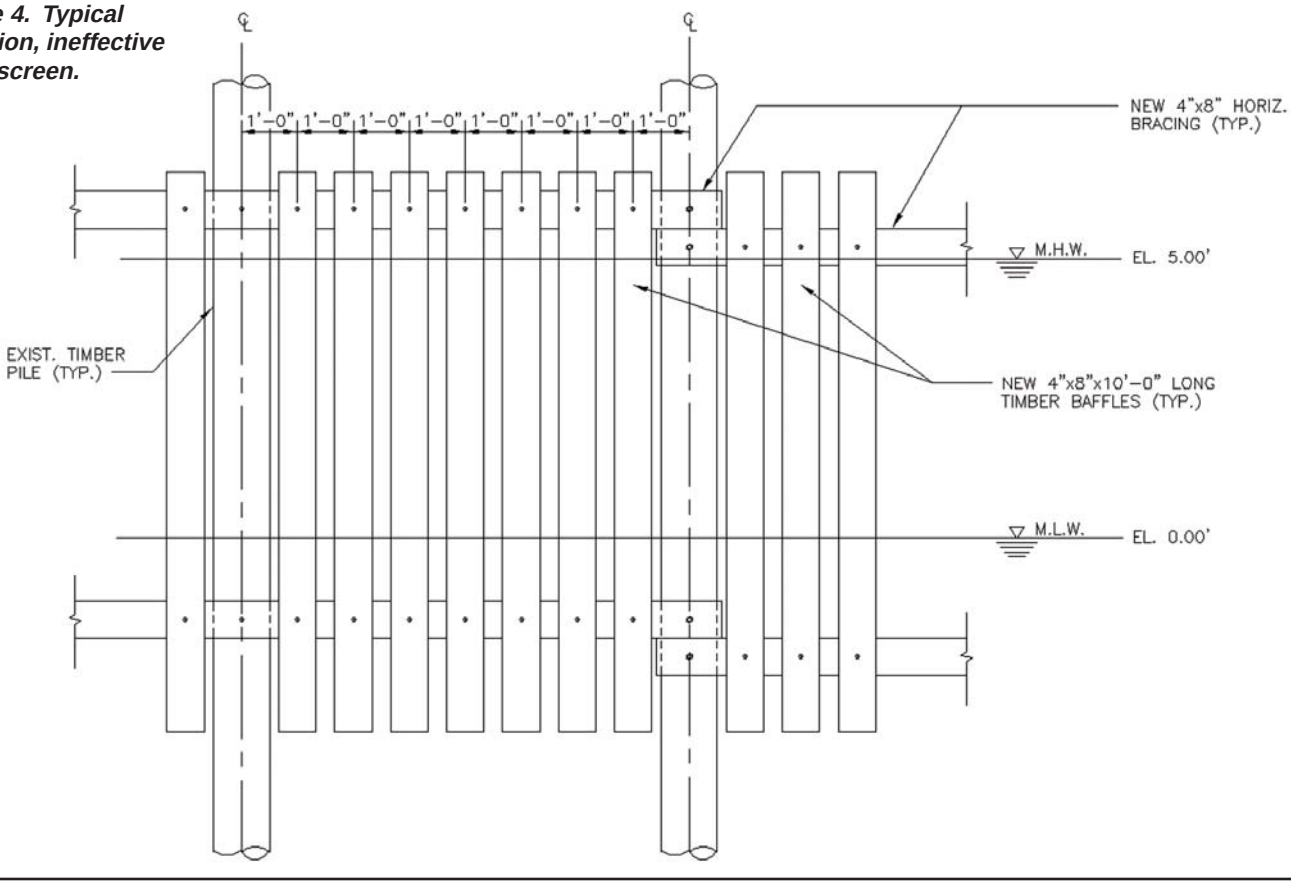


Figure 3. Plan view of wave screen cross-section.

Besides wall porosity, other factors can also effect wave transmission. If the wave screen does not extend all the way to the bottom, incoming wave energy will go under the wave board (due to the depth influence previously discussed). If the wave screen is not tall enough, there is the possibility that incoming waves could overtop the wall. Finally, water waves will refract around the end of an object, much like waves of visible light. So a wave screen that is not sufficiently long will allow waves to "wrap" around the ends and further add to the "chop" inside the boat basin. All of these effects are cumulative, so the total wave transmission into the protected boat basin is the sum of the transmission effects of wave energy going over, under, around and through the wave screen. Such problems have been encountered at Coast Guard Station Scituate, Massachusetts, and the Aids to Navigation Team (ANT) facilities located in Bristol, Rhode Island. In both cases, a wave screen was built on the seaward side of the pier to which the floating docks for the small boats were/are attached. Figure 4 shows a typical elevation view of the wave screens.

Figure 4. Typical elevation, ineffective wave screen.



The wave screens extended only a few feet below mean low water (wave energy passed under), the wave boards were spaced too far apart (P=0.4 according to Equation 2 above, so waves pass through), and in both cases the length of the wave screen was insufficient (waves wrapped around the ends). Station Scituate was decommissioned in recent years and the new Station Small Scituate berths its boats at the well-protected town marina, but problems with the wave climate at ANT Bristol remain. Fortunately, all of the other wave screens currently in place in the First District are solid faced timber walls extending all the way to the bottom. In fact, when the walls were built, the toe of the timber sheets were embedded in the bottom for additional structural support, which is fortunate for Group Long Island Sound, located in New Haven, Connecticut as will be discussed shortly.

Southwest Harbor Boatlift Piers - Catalyst for Change

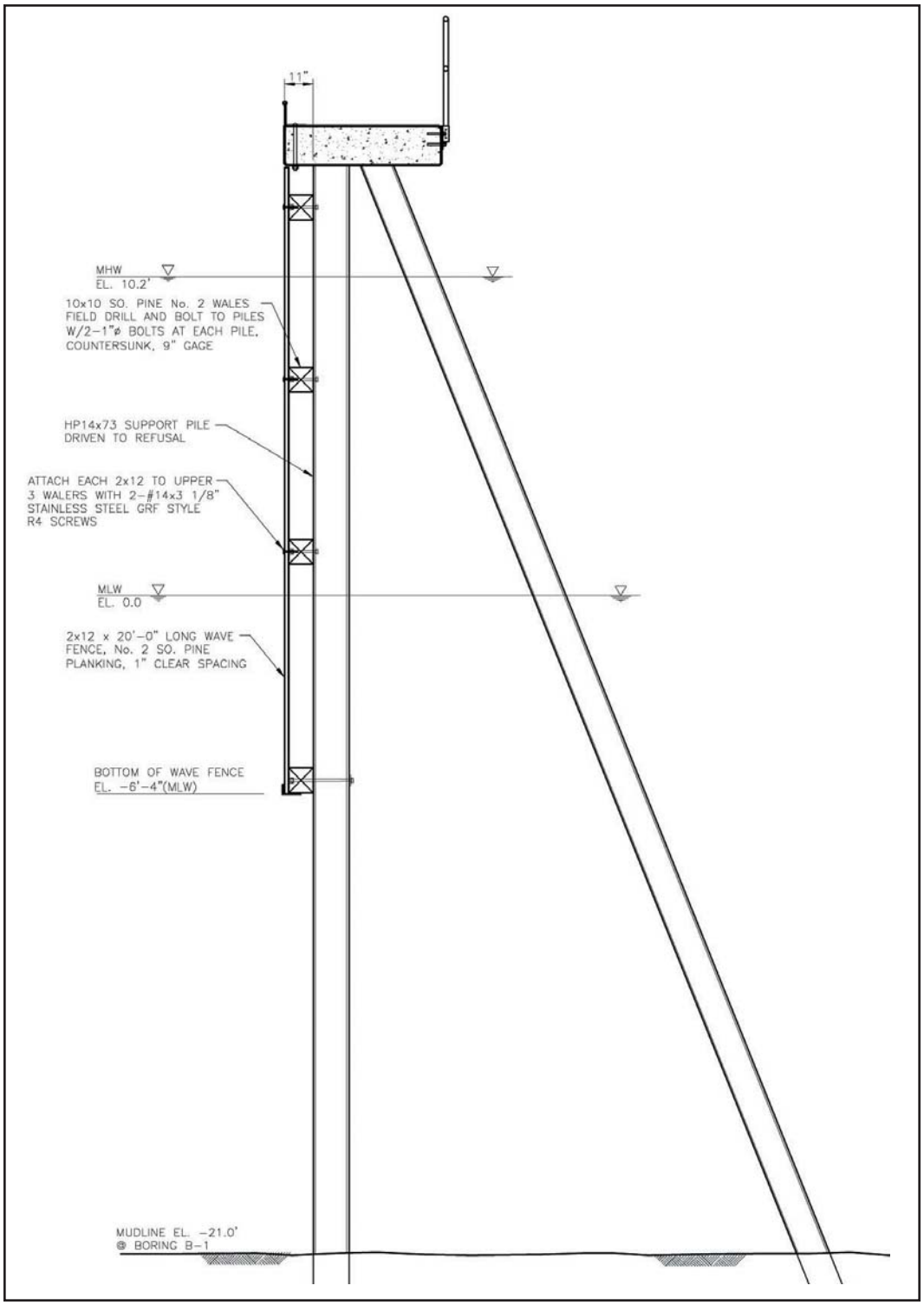
In late summer of 2002, the contract to design and build new boatlift finger piers at the Coast Guard facilities in Southwest Harbor, Maine was awarded to a local marine construction company with a history of good performance on Coast Guard projects in the region. The southern side of the site is exposed to incoming waves from Casco Bay and the Atlantic Ocean, so the contract required that the interior faces of the boatlift piers be lined with wave boards to provide a calm slip to maneuver boats for hoisting. Spacing between the wave boards was specified not to exceed ½ inch. Initially we required that the wave boards be long enough to extend from +10 feet above Mean Low Water (MLW) to within 6 inches of the bottom (approximately -19 feet). Later this requirement was relaxed to allow the wave boards to extend only to -6 feet below MLW. The performance requirements for the wave screen required that it withstand the forces resulting from the annual storm wave event, but "break away" under wave forces generated by the "25-year" storm to prevent damage to the boatlift piers under such conditions. Based on these generic requirements, the general contractor developed a conceptual design, without full engineering computations, that

Figure 5. Southwest Harbor, maine boatlift piers conceptual design.

assumed the wave screen would be supported by steel pile bents spaced 15 feet on center. This conceptual (e.g., 10%) design is shown in Figure 5, and formed the basis for contractor's estimates and formal (winning) proposal.

Once the sub-contracted engineering firm began designing the boatlift piers and wave screen, they found that the conventional methods for predicting wave forces on the wave screen resulted in forces that required closer pile bent spacing to resist overturning. This became the subject of debates between the project manager, engineer and contractor. The contractor felt entitled to an adjustment in the contract price because the final design called for closer pile bents (spaced 9 feet on center (oc)) than what his proposal was based on (15 feet oc). The Civil Engineering Unit (CEU) Providence engineer's viewpoint was that inherent in a "design-build" contract the contractor assumes a degree of risk, and it is up to him to pick an appropriate design. Beginning with the very first 50% design submittal, CEU Providence engineers had recognized that the proposed design was based on the very conservative Sainflou method of determining wave forces on vertical walls, which was introduced in 1928, is known to overestimate wave forces, and has been superceded by more recent methods. Furthermore, the applicability of the Sainflou method to this design was suspect. CEU Providence recommended that the wave forces be re-calculated using the method presented in the new Army Corps of Engineers Coastal Engineering Manual (CEM) for "wave barriers." A critical characteristic of this wave screen was that it would only extend to -6 feet below MLW, as shown in Figure 6.

Figure 6. New Group SW Harbor boatlift pier section showing wave screen.



Both the CEM and its predecessor, the 1984 edition of the Army Corp's Shore Protection Manual (SPM), state that the Sainflou method is applicable only to vertical walls that penetrate all the way to the bottom. Unlike the SPM, however, the new CEM for the first time presents users with an empirical method of calculating the force on partial-depth solid (e.g., no space between the boards) wave screens. This new method is based on the work of Kriebel et al. (1998) who showed conclusively that the Sainflou method does indeed over predict forces on partial depth wave screens. He also presented a theoretical model which accurately (within 10-20%) predicted forces on solid partial-depth wave screens as verified by scale model laboratory test results. Unfortunately, Kriebel's method was based on an eigenfunction expansion method of solving for the wave velocity potential on both sides of the wave screen, and required use of a computer to solve the resulting matrix equations for unknown complex coefficients. A simplified empirical equation was developed specifically for the CEM based on Kriebel's 1998 laboratory test results. Using this updated method, CEU Providence engineers determined that 15-foot pile bent spacing could have been used safely.

Eventually however, a $22,000 adjustment in the contract price was made -- the construction company was compensated for additional material costs, but not labor costs. Although it was applicable in the Southwest Harbor case, the CEM method for predicting forces on partial depth wave screens has several limitations which limit its use. Specifically, use of the method is limited to the following cases:

$$0.4 \leq \frac{w}{h} \leq 0.7$$

$$0.14 \leq \frac{w}{L_p} \leq 0.5$$

Where w = wave screen penetration depth, h = water depth, and L_p = local wavelength associated with the peak spectral period T_p of the wave spectrum. Furthermore, the method is only applicable to solid wave screens, with no space between the boards. Previous predictive methods by Kriebel and Grüne et al. were only for full-depth permeable wave screens. Thus there appears to be a significant hole in the current state of the art; no method exists to accurately predict wave forces on partial-depth permeable wave screens over a wide range of values for relative barrier penetration depth and wave steepness.

Why Do We Care and Where do We Go From Here?

Although not as permanent or maintenance free as riprap breakwaters, properly designed and built timber wave screens can provide years of service at a fraction of the cost to build a riprap wave barrier. Besides the cost, riprap wave barriers are also frequently in conflict with coastal zone management and environmental protection regulations. Partial-depth timber wave screens in particular are suited to provide the necessary wave protection for Coast Guard assets while minimizing environmental impact, because subsurface currents and biological activity are unencumbered. In the cases where we have timber wave screens already in place, we will most certainly maintain or replace them in kind rather than attempt to build a more "permanent" solution. Investigation of the timber wave screen at Group Long Island Sound in New Haven, Connecticut in the fall of 2002 revealed several structural elements that had completely failed, and others that soon will fail if left alone. Figure 2 above is an actual cross-section of the New Haven wave screen. A particular 25 foot length of the wave screen that is supported by four timber bearing piles was found to have only two remaining intact above-water connections out of a possible eight. The bolts holding the horizontal wales to the piles had simply broken, or been pulled out. The wave screen has visibly settled below its original elevation, and CEU Providence engineers suspect that the wave screen is simply resting on the bottom, supported by the timber wave screen boards, with the two remaining bolted connections keeping it from falling over. CEU Providence engineers are working on designs to replace the damaged section of wave screen, which comprises about 20% of the total length of wave screen at the site. Much of the remaining wave screen will need to be replaced in the next 5-10 years. It is doubtful that the existing pier can continue to support such massive timber members (12x24 timber wales, and 4x12 vertical wave boards), so a new design for replacing the wave screen needs to be examined.

A partial-depth, semi-permeable timber wave screen offers the advantages of being more environmental-

ly friendly, easier to construct, and uses less material than a comparable full-depth solid wave screen. A design method for both full and partial depth, permeable and impermeable timber breakwaters with appropriately low transmission coefficients is needed to meet CEU Providence's anticipated wave screen repair and replacement projects in upcoming years. CEU Providence recently awarded a contract to Dr. Kriebel and the U.S. Naval Academy's Ocean Engineering Department to develop this overarching design method. Specifically, existing uses of wave screens in the First District will be examined, existing laboratory test data will be re-evaluated, and further model tests in the U.S. Naval Academy's wave tank will be conducted to expand the range of applicable environmental conditions for which the resulting empirical design method can be applied. Dr. Kriebel will begin initial work in early summer, with CEU Providence assistance during model testing and data analysis in late summer 2003. The final report and new design methodology is expected to be finished by November 2003, with subsequent publication in *Systems Times* as a follow-up to this discussion.

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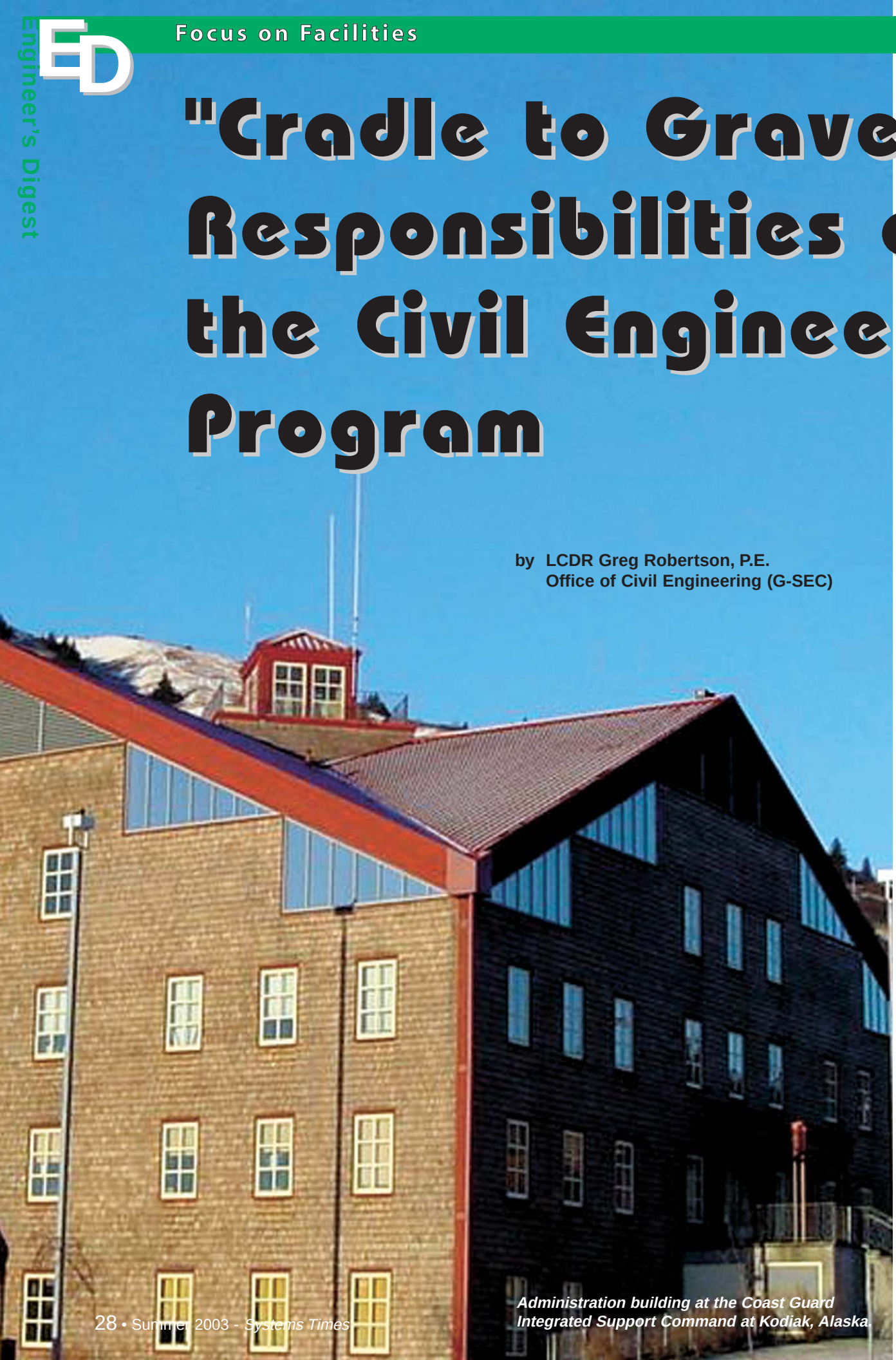
"Cradle to Grave": Responsibilities of the Civil Engineer Program

by LCDR Greg Robertson, P.E.
Office of Civil Engineering (G-SEC)



Administration building at the Coast Guard Integrated Support Command at Kodiak, Alaska.

USCG photo by Lt.j.g. David Aragon

Winston Churchill once said, "We shape our buildings, and afterwards our buildings shape us." Understanding this, we can appreciate the importance of sound Shore Facility Capital Asset Management (SFCAM). In the simplest of terms, SFCAM is about fully understanding the business of the Coast Guard and how the real property managed by the Civil Engineering Program supports operational readiness.

SFCAM was developed to integrate these stewardship services with the needs of many diverse units within the Coast Guard. This was done, in my view, because our leaders wisely understood that the facilities we provide have a significant impact on the Coast Guard's pursuit of operational excellence, and that we can only deliver effective/efficient solutions with a full understanding of how the Coast Guard operates.

SO HOW DO WE DO THIS?

To maximize the impact of money we spend on shore facilities, we have to target these funds in a way that produces the greatest return on investment. The only way to do that is to take a holistic view of the facility by appreciating its entire life cycle (see Figure 1, Life Cycle of Facilities). Understanding the performance and needs of a facility from cradle to grave is the only way to ensure it is the best fit for our organization.

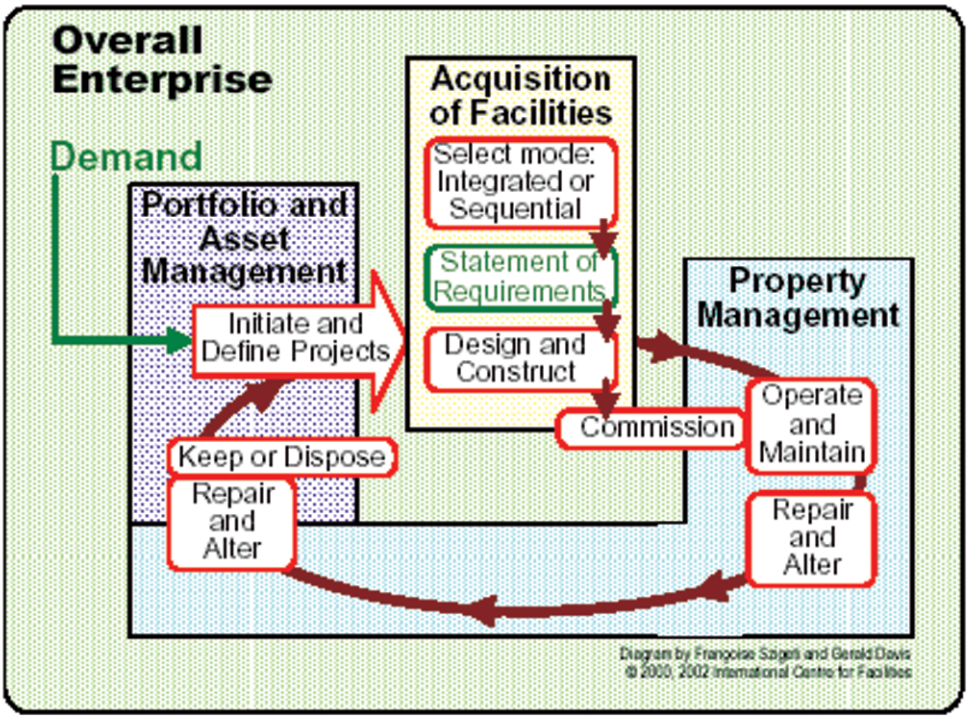
In the future, planning for new facilities will be better, faster and cheaper. That's good news because the planning stage has the greatest impact on the cost of ownership throughout the facility's life. The way we improve our planning process and life cycle management is through Regional Strategic Planning.

REGIONAL STRATEGIC PLANNING (RSP)

The SFCAM division of G-SEC (Office of Civil Engineering) has partnered with Civil Engineering Unit (CEU) Miami and the Civil Engineering Technology Center (CETC) to prototype this planning process for the Charleston area. An overview of the RSP process is shown in Figure 2, see next page. The RSP begins by defining a regional area and all current Coast Guard activities in that area -- the scope. Then a SWOT analysis (Strengths, Weaknesses, Opportunities and Threats) is conducted to take a strategic look at Coast Guard operations in that regional area. Based on this understanding, the RSP addresses how the Coast Guard will need to operate in the future and the complementing logistics support that will be required to sustain this level of operations.

The required support is compared against what is available on site, and a plan is developed to close the gap between what we have and what we need. Finally, costs are estimated for closing this gap. These costs are combined with the cost of operating according to this plan, and these are shown broken out by funding stream. The

Figure 1.



Life Cycle of Facilities: Three Domains

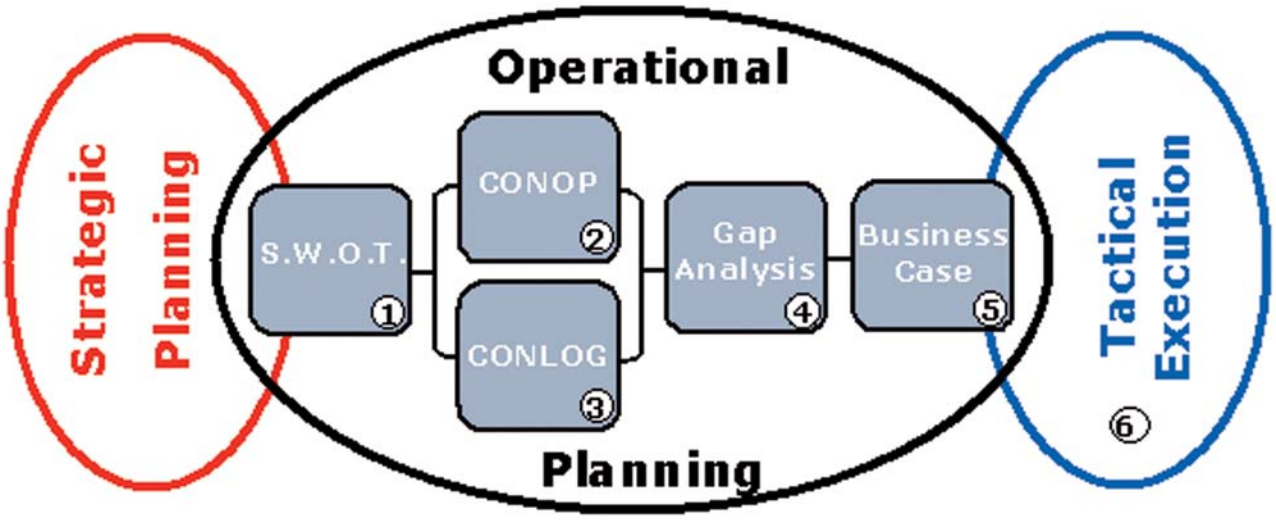


Figure 2.

RSP clearly shows the cost of doing business in a particular way (total ownership costs). Then other plans with associated costs are developed that offer differing ways of operating and/or supporting operations. These are referred to as concepts of operations (CONOP) and concepts of logistics (CONLOG).

In the end, decision makers are given a menu of choices for various CONOPs with complementing CONLOGs and the all-important cost figure to help with the decision. Imagine strolling into an upscale restaurant for dinner, reading the menu and seeing no costs listed with the menu choices. Personally, if I had the courage to stay, I know I wouldn't enjoy the meal as I would spend the evening wondering what dinner was going to cost. In the future we will facilitate decisions by developing this menu of choices with associated costs. The ability to leverage data and automate development of cost estimates will provide better cost accuracy and a greater variety of options.

For these options to be fully developed and optimized, the RSP brings all interested parties to the table to contribute to their development. As an example, the development of the CONLOG incorporates a whole series of logistics assessments including: civil engineering, naval engineering, C4ISR (Command, Control, Communications, Computer, Intelligence, Surveillance and Reconnaissance), etc. The civil engineering piece of developing the CONLOG considers the capability and condition of the shore plant. Developing a CONLOG in this way will help civil engineers better appreciate the contribution of shore facilities in the context of the big picture.

To create such a robust plan with sound data on which to base decisions requires a comprehensive, current and sustainable database covering our shore facilities. To keep this data current requires capturing data at a transactional level by using Information Technology (IT) tools that allow us to accomplish our work while recording information about what we are doing. One good example of how this works is a Computerized Management Maintenance System (CMMS) like *Maximo*. *Maximo* allows you to maintain equipment and manage work to respond to reported problems, while capturing helpful data like when the equipment has experienced problems, what caused the problem and who fixed it. This data can be analyzed to help facility managers focus limited resources on problematic equipment.

The databases needed for RSPs include virtual building models, CMMS data on building maintenance needs, project data on 43 and Acquisition, Construction & Improvement (AC&I) needs, and geo-encoded data (GIS) about the nature of CG sites.

An integral part of conducting RSPs is modeling our facilities, essentially creating intelligent virtual buildings. Figure 3 shows the virtual facility at Station Georgetown. These intelligent models are really

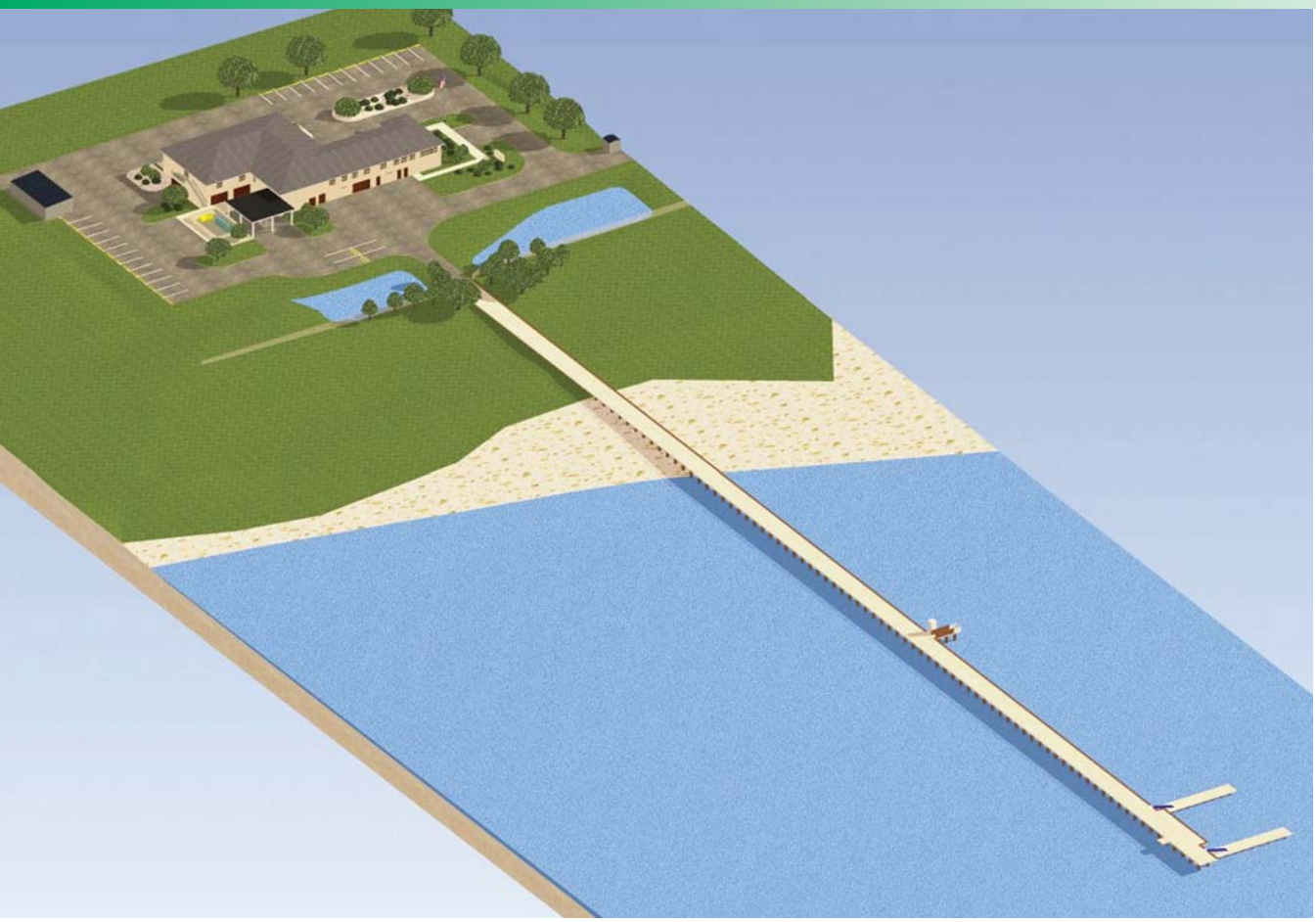


Figure 3. A virtual facility at Station Georgetown.

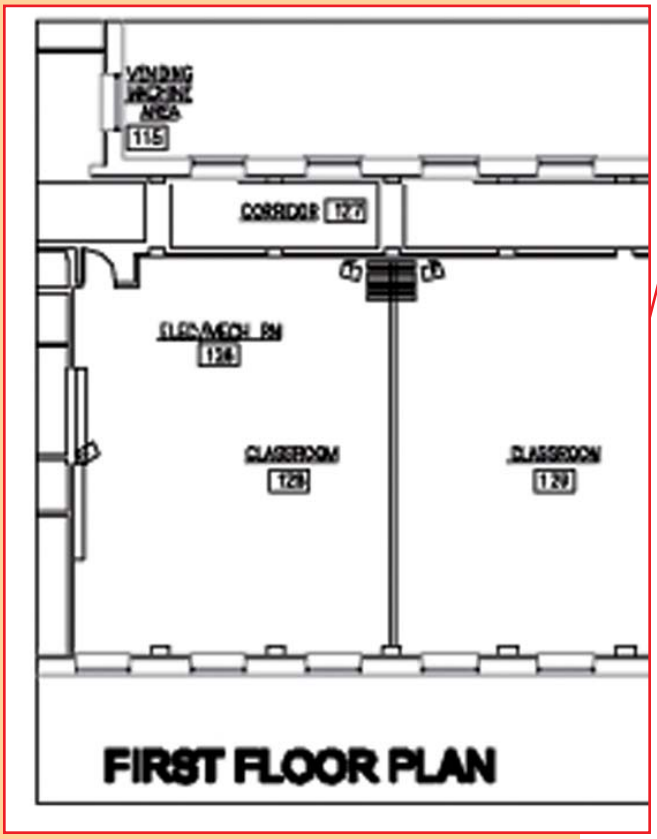
databases that include geometry so they can display our facilities in three dimensions, and objects that understand what they are and how they behave.

Example: The Heating, Ventilation and Air Conditioning (HVAC) unit in the Marine Safety Office (MSO) Charleston building carries its physical size, its specification information and its maximum capacity. Simply by selecting this object anyone can get information necessary to do projects now and in the future on this system. By seeing the HVAC unit in context, the 3D room and the space remaining at the same time, more decisions can be made quicker, and more accurately. Instead of opening up four files and a spec book, the activity is compressed to one query that is more informative. If the location of the unit is changed, then the model automatically updates all relevant information including any drawings, and reports that this unit affects.

The use of these models is expanding quickly. We can already run energy use simulations and cost calculations based on the models. We can extract reports that help us make design decisions. This allows planning scenarios to be sophisticated enough to include virtual facilities that bring with them data about cost, energy use, etc. Further, by designing facilities in this way, we have better information to begin a project, more information on how the facilities will perform throughout their life cycle, and easier ways to convey complex design decisions.

The RSP will include a collection of possible futures with associated plans to respond accordingly. When an RSP is completed in an area, the facility plan is essentially complete to about the PPRA stage -- conceptual design. We will look at possible futures and the associated shore facility requirements, and we will see where certain requirements are needed for a variety of different futures. For those requirements that persist for many different futures, we will move forward with the AC&I planning process to respond.

This is coming together in Charleston, and in the near future we will have plans in place Coast Guard wide. The facility requirements, costs and impacts will be understood for a variety of futures, and those requirements that are common for the most probable outcomes will already be moving forward in the planning process.



DESIGN-BIM Building Information Modeling

Design is streamlined as well. Today, new projects always have a component of recreating and verifying information before the real work begins. With the use of model based design this re-creation of information is reduced or eliminated saving funds for the design. This allows for more design time, more study and therefore a better solution for the Coast Guard.

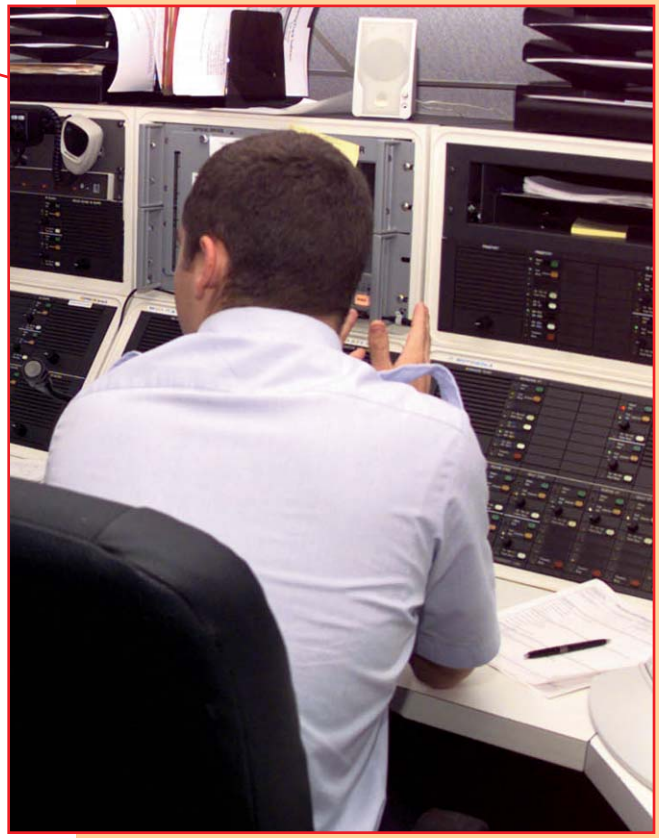
Additional information in the form of simulations on energy consumption, or security is too costly in today's process but cost effective in a model based design process. Designers can interrogate the model for information that used to be in many different databases. One source for current information means faster design decisions.

Changes to the design can be quickly evaluated for impacts on performance including: cost, life safety code, fire safety, etc. Many possible designs can be considered and evaluated quickly and easily, and a better design can be developed for eventual construction. The customer can be shown the model of the building and can provide input on the design without being able to read drawings … this is very powerful and is a key advantage to this technique. What's more, in addition to conventional drawings, contractors will be given the model of the building so they can easily see what it's supposed to look like. Our ability as designers to communicate with our customers through visual decision-making is part of this streamlined process.

CONSTRUCTION

Contractors will use the building model to improve the quality of the product they provide. They can run software to simulate the building being constructed (4D), and see how best to plan for construction. They can bid a project easily because the model can be interrogated to provide information for costing, and they have enough information early to make value engineering recommendations -- a real bonus in the process. Submittals will be provided by changing objects in the model to match those provided by their supplier of choice. Once construction is completed, as-built conditions will be provided by the contractor in an updated model that includes information about the actual equipment installed in the building.

OPERATIONS AND MAINTENANCE



The building model provided by the contractor will be used to operate and maintain the building, and it will contribute to the information considered in future planning evolutions. The facility objects will be queried and *Maximo* populated with information about the equipment in the building and what maintenance is required. *Maximo* will automatically generate work orders for preventative maintenance on the installed equipment. These work orders will generate when they should be done and include the actual steps for a given maintenance procedure. The building will be maintained optimally, and the best stewardship of this new facility is achieved. Existing facilities will be modeled in *ArchiCAD*, interrogated to populate *Maximo*, and maintenance assigned based on the equipment in these buildings. A predictive model can be developed that predicts when a building component needs replaced and the prediction refined whenever corrective maintenance on that component is required as evidenced by a *Maximo* transaction. Facility Condition Assessments (FCA) will become a quality assurance exercise to validate the information predicted in our model of building component performance. Rather than inspecting all facilities every two years, we will focus on facilities critical to our mission and those facilities that have maintenance activity in *Maximo* indicating a different condition than that expected based on our last inspection. After the assessment, the predictive condition model will be refined based on performance of building systems in the field, and the cycle continues.

Since this building database will contain information on when systems need replaced, it will include a cost liability for any given building in the Coast Guard. What's more, the system will collect data on actual costs to maintain facilities that can be compared against the predicted costs for maintenance. Seeing the impact of our expenditures on the condition of the shore plant relative to what the impact should have been, allows us to measure effectiveness and understand trends in our performance as facility managers.

DEMOLITION OR RECAPITALIZATION

A facility eventually reaches a point where you either put a lot of money into it to keep it viable or

you knock it down before it becomes unsafe. The key is for the Coast Guard to have the discipline to make this decision before we end up with both -- spending a lot of money and still operating an unsafe, antiquated facility. This decision is better made as you transition back to the planning part of the building life cycle, and it's made based on what is best for the Coast Guard from a cost and capability standpoint. The RSP framework provides all the information relevant to making this decision. Further, the RSP highlights the facilities that are attractive candidates for divestiture.

MDI - Mission Dependency Index

We need to prioritize our repair needs in a very sophisticated fashion by considering pertinent factors like the importance of the facility to accomplishing the mission. The MDI successfully links facilities to mission and provides the understanding needed for allocating scarce resources. Critical facilities should receive repair funding first, and those with low MDI scores should be considered potential divestiture candidates.

Another critically important measure is the condition of a building system in need of repair. Maintenance expenditures are optimized through tracking the level of degradation and performing maintenance at the right time -- ideally prior to the mid-life point. Maintenance timing, like a golf club, has a sweet spot.

The MDI will allow us to rate our facilities in terms of their importance in accomplishing our mission. The measure is an important consideration in planning, particularly at the end of the facility's life cycle. However, the metric stored in the model as a visual color bar will enable us to allocate resources more effectively and assess our security posture based on which parts of the facility are most important to operations.

CONCLUSION

By far the greatest emphasis in this article has been on the planning stage of the life cycle. This is fitting when you consider this step has the greatest impact on future costs, utility and service of a facility. This is also where changes can be easily made at low cost.

The RSP information system is designed to present pertinent information in a geospatial way, enabling decisions to be made with the best understanding possible of all relevant data. Our databases will be integrated with the valuable data we need to make decisions collected through the course of our normal business, utilizing IT tools chosen to ease our workload rather than compound it. In essence, we will work with tools that perform the functions we've always felt were necessary, and we'll be able to incorporate large amounts of disparate data easily in deciding the best course of action for the CG to pursue, no matter what the future may bring.

I cannot say when all of these changes will become reality, but I can say with conviction, the sooner the better. We create and maintain facilities that impact the Coast Guard's ability to perform our missions, and we must forever pursue ways to do this better. Ways that maximize our effectiveness and help our personal productivity. As Winston Churchill said, "We shape our buildings, and afterwards our buildings shape us."

Acknowledgments:
Gerald Davis from the International Centre for Facilities graciously allowed the use of his diagram depicting the Life Cycle of Facilities. Dianne Davis of A/E/C Infosystems provided an editorial review of the article and graphics to illustrate object models. LCDR James Dempsey, Mr. David Hammond and LT Craig Foos (all from G-SEC) provided critical ideas and insight on the content of the article.

Asset Management Principle #1: Use What You Have First

by Civil Engineering Unit Juneau

In the 1990s, District 17 (D17) Planning Officers evaluated the Public Works requirements for the Marine Safety Office (MSO) in Valdez, Alaska.

- MSO Valdez has an extensive housing site with seven sets of fourplex townhouses. The Public Works, whose primary function is the maintenance of family housing, is not collocated with the housing complex but down at MSO's moorings.
- The MSO did not have any small boat resources and the moorings (a small floating dock) were excess to the unit's needs.
- A plan was developed to move activities out of the Public Works building at the moorings and locate the activities closer to the site of their work.
- The intent was to then divest the old Public Works building and mooring as excess to the Coast Guard's needs.

MSO Valdez's Public Works building (white building/blue roof) and the floating dock.

When the Acquisition, Construction & Improvement (AC&I) threshold was increased to $500,000, the opportunity to implement the plan became a reality. The Public Works functions were to be rebuilt at the housing area and the Electronics Support Detachment (ESD), temporarily located in the building, was to have a small addition built on the MSO's building, adjacent to their customers.

Post 9/11, the Coast Guard ramped up security in Valdez. They created a waterborne security presence. The Coast Guard Cutter LONG ISLAND is being transferred from San Diego, California to its new homeport in Valdez. D17 and Civil Engineering Unit (CEU) Juneau are continuing with the Allotment Fund Control Code (AFC) -43 funded projects to vacate the Public Works building. Employing Asset Management Principle #1: Use What You Have First, CEU Juneau, instead of declaring it excess, will meet the new operational need with this property. The District has submitted an AC&I problem statement to replace the facilities at the moorings with new buildings and moorings designed to support the new waterside security forces in Valdez. The foresight by the planners in developing the project to move the Public Works and ESD functions out of the waterfront building has created the opportunity for the correct solution years ahead of schedule.

The Changing Face of Base San Juan:

FDCCLANT Meets the Construction Challenges

by **Henry W. Ames, P.E.**
Facilities Design and Construction Center Atlantic

The Coast Guard Base in San Juan, Puerto Rico has seen tremendous facility improvements in the last several years. Since January 2000, the Facilities Design and Construction Center Atlantic (FDCCLANT) has awarded over $21,511,000 of new construction for the Base. The new facilities serve as shining examples of the Commandant's commitment to Readiness, People and Stewardship.

The new facilities include two multi-story Unaccompanied Personnel Housing (UPH) facilities, an extensive addition to a historically significant Operations Building (OPS), a new Vessel Support Building (VES) and a new CGES Exchange in yet another renovated historical building. The design and construction of these projects has seen many challenges encompassing the default of a contractor, extensive historical preservation efforts and close coordination of construction activities on a very congested and active Coast Guard Base. Successful completion of these projects involved innovative methods of project management utilized by FDCCLANT to ensure a close working relationship with the staff of the Commanding Officer of Coast Guard Base San Juan. Recognizing the intense construction effort slated for Base San Juan, FDCCLANT structured a specific construction team to manage the overall effort. This team consisted of:

a) a detached billet for a construction Project Manager (PM) acting as the FDCCLANT liaison with Base San Juan who provided daily on-site management for the UPH project;
b) an in-house senior construction manager acting as a mentor to the detached PM and construction PM for the Marine Safety Office/Operations/Vessel Support Building (MSO/OPS/VES) and Exchange project;
c) a Puerto Rican National civil engineer for daily inspection of the UPH;
d) an in-house inspector acting as mentor on the UPH project and inspector on the MSO/OPS/VES/Exchange; and

e) an in-house FDCCLANT contract specialist and construction team manager, that provided home office support from Norfolk, Virginia.

This article provides the reader a snapshot of these projects, their challenges and the personnel involved in the successful execution of this extensive building program.

Unaccompanied Personnel Housing

UPH North Building.

In January 2000, the initial contract for construction of this facility was awarded to Constructora Celta Inc., a local Puerto Ricon firm, for the sum of $11,800,000. The UPH facility was the largest shore Acquisition, Construction & Improvement (AC&I) project at that time, and was designed to serve the unaccompanied personnel assigned to the Greater Antilles Section, which included a total of 11 operational commands and two detached Maintenance and Logistics Command (MLC) support units. The facilities consisted of two new buildings totaling 56,000 Square Feet (SF), including 100 berthing rooms, galley, recreation room and fitness center.

The initial challenges faced by the FDCCLANT team in ensuring a quality facility were the distance involved from FDCCLANT, the magnitude of the on-site workforce totaling over 150 personnel and the inherent nature of local construction standards. Early in the project, the poor quality of work, contractor's lack of sub-contractors coordination, and a steady failure to maintain his schedule lead to the establishment of weekly quality/coordination meetings conducted by the on-site team and the prime contractor. This innovative approach proved to be invaluable when, in February 2002, FDCCLANT made the difficult decision to default Constructora Celta Inc. for a failure to satisfactorily progress. The challenges to the San Juan construction team grew as a result of this decision and were exacerbated by the retirement in January 2002 of the senior construction PM and team mentor. However, FDCCLANT quickly rose to the challenge through the tireless efforts of the remaining team members. By utilizing the documentation from the weekly meetings, the team was able to quickly provide the Bonding Company an immediate and accurate assessment of the project, while continuing to manage the nearly $10M of other on-going projects.

During the take-over process of the defaulted contract another significant challenge arose with the departure of the on-site construction PM. Anticipating this departure, FDCCLANT hired an experienced Project Manager in time to provide for a turnover period with the construction team that allowed a seamless transfer of responsibility and reassured Base San Juan personnel that the level of attention on the continuing construction effort would not diminish in any aspect. These intensive on-site management techniques and actions proved to be beneficial as the default action was strongly contested by the contractor. However, due in large part to the superior documentation provided through these quality meetings and the efforts of the on-site staff, FDCCLANT successfully prevailed in negotiations resolving this disputed action with the Bonding Company without litigation, assessing over $550,000 in liquidated damages.

Lastly, the acceptance inspection of the UPH facility posed yet another challenge to the staff of FDCCLANT. Because of the inherent degree of inspection required to accept the two facilities was enormous, it required a combined and considerable team effort on the part of the entire FDCCLANT staff. The final inspection occurred over a two-week period and was enhanced by the participation of FDCCLANT's design architect, and mechanical and electrical engineer. Through this team effort, the contractor was able to correct all discrepancies within a two-week period. The Coast Guard accepted a quality facility on 14 March 2003 signaling the successful conclusion of this challenging project. Of particular note is the fact that the overall change order rate on this facility was less than two percent. Occupancy of the facility began in mid-April 2003 following an intense outfitting effort, assisted by the same construction team.

Marine Safety Office/Operations Building Addition and Vessel Support Building

This project was the result of combining two larger projects into one construction project. The project was awarded on 10 January 2001 for a sum of $8,004,500 and consisted of three phases providing initially a 10,000 SF addition to Building 100 followed by the completion of the new 18,800 SF VES building, and concluding with the renovation of the existing Building 100. This project will co-locate the Operations and Marine Safety Office under one roof and will provide for increased synergy between these two vital entities needed to support the current homeland defense initiatives. The new VES Building will house the Maintenance Augmentation Team (MAT), Electronics Support Detachment (ESD) and the six home ported 110' WPBs (Patrol Boats) offices. In the initial phases of construction, a significant archeological find was uncovered. A large stone wall was discovered and was believed to have been associated with the Santo Toribio Battery, which existed here in the early 19th century. This discovery required intensive coordination between FDCCLANT, the contractor and the State Historic Preservation Office (SHPO) to perform data recovery and shifting of contract work to mitigate schedule impacts. This coordination was completely successful in meeting all the preservation requirements and preventing any delays to the contractor's schedule. Another significant challenge to overcome in construction of the project was the specified shut down to reroute the power of the Operations Center, which controls all search and rescue efforts in the eastern Caribbean Basin. Through superb organization and attention to detail this critical power outage lasted only three hours, which was much less than anticipated. The team was challenged repeatedly in the construction of the new addition because of the close proximity to a secure facility and the secure location designation for the new second floor addition. Due to the nature of the new facility's mission, many details remained to be worked out with the customer during the final stages of con-

Vessel Support Building.

Building 100 Addition.

Vanto Toribio Battery Walls.

struction. This resulted in several changes to the original design but through dedication and unfaltering efforts by the on-site construction team these were quickly incorporated into the final product without impact to the schedule. Incumbent in this effort to deliver a quality building, the FDC-CLANT team coordinated with MLC (t) (Electronics Systems Division) and a separate contractor to complete the cutover from the existing Building 100 to the new addition was put in place. The FDCCLANT construction team continues to monitor and manage the construction effort, delivering to Base San Juan the Building 100 addition on 15 December 2002 and the new Vessel Support Building on 15 April 2003. The renovation of Building 100 remains on schedule for completion by 2 November 2003.

New CGES Base Exchange

This project involved the rehabilitation of an existing historical structure to provide a 9,000 SF CGES Exchange. The initial procurement package produced bids much higher than the Government estimate. In response to this event, FDCCLANT entered into a Design/Build contract with the 8A contractor building the MSO/OPS/VES facility. This was one of the first ventures of this type for FDCCLANT and proved to be highly successful. Through value engineering and superb cooperation of all involved the final design provided for a facility with a better layout than originally planned and saved $500,000 from the original design. Other successful outcomes of this innovative partnership approach included preserving a larger portion of the historic building and allowing for the continuation of the exchange operation during construction of the new facility. The Base San Juan Exchange is one of the most profitable CGES locations and a temporary closure would have had a disastrous impact to the GANTSEC MWR fund and to the morale of the base personnel. The new CGES Base Exchange was opened for business in July 2002 and is conducting a thriving business in new quality surroundings.

Base San Juan is an historic facility with an inventory of 36 buildings ranging in age up to 105 years and encompassing 170,000 square feet of floor space. Construction of these new facilities has reduced the average age of buildings from 50 to 44 years, and more significantly, renewed over one half of the total square footage in the Base San Juan portfolio.

CGES Exchange Base San Juan.

GANTSEC/Base San Juan Commanding Officer, Captain Douglas Rudolph remarked "Major improvements are underway at Base San Juan which are updating the facility and making it both more functional and a better place to live and work. Located in one of the oldest cities in the Caribbean, great care was taken to blend with the historic Spanish architecture resulting in probably the most picturesque base in the Coast Guard. The construction has taken a number of years and is not over yet, but it is sure worth the wait." ST

Shore Facility Recapitalization in the Deepwater Era

by LCDR Paul Boinay
Maintenance and Logistics Command Atlantic

"For decades, Coast Guard crews have dealt with aging cutters and aircraft by giving a little more of their blood, sweat and tears to meet the challenge of the mission at hand … In recent years, the limited capabilities of these craft became more visible. Availability, due to dockside periods or maintenance became a much larger issue for forward planners as the fleet aged beneath their feet … More than two-thirds of the existing deepwater assets were expected to reach the end of their planned service life over the next 15 years."
These quotes from the Commandant (G-D) web site[1] describe the origins of the multi-billion dollar Deepwater Program. Substituting "buildings, piers and housing" for "cutters and aircraft," and these quotes could just as easily describe the current condition of Coast Guard (CG) shore facilities.

At present, 50% of all Coast Guard buildings, waterfront facilities and family housing units are beyond their mid-life[2] points. Thirty percent of our buildings are more than 50 years old. Historical recapitalization funding has long failed to keep pace with the effects of facility aging and lags far behind the 50-year industry standard. In order to recapitalize our shore facilities on a 50-year cycle, the existing $7.3 billion shore facility inventory should receive about $140 million in Capital Acquisition funding (CA - formerly AC&I) every year. As Figure 1 clearly shows, the past six years have had funding levels of around $65M, or less than 50% of the amount required. Of particular concern is the decrease in available funds in Fiscal Year 2003 (FY03), the expectation of zero CA funds in FY04, and the potential linkage between future CA fund availability and increased Deepwater acquisitions.

Lacking sufficient recapitalization funding, various program-wide asset management strategies have been implemented, including specific goals targeting annual shore facilities divestitures; increased use of Allotment Fund Control Code (AFC) -43 maintenance funding for deferred maintenance projects; better documentation of shore facility recapitalization requirements; and an increase in the $350K threshold between AFC4-3 and AC&I/CA funding to $500K to permit certain larger projects to be accomplished without the need for CA. These measures, while an effective short-term strategy to deal with the current budget climate, are not a viable alternative in the long-term for adequate recapitalization of the aging shore plant.

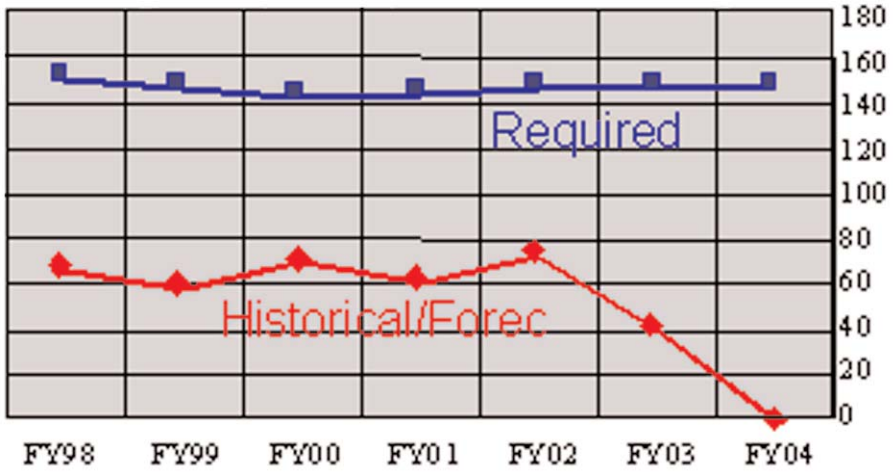


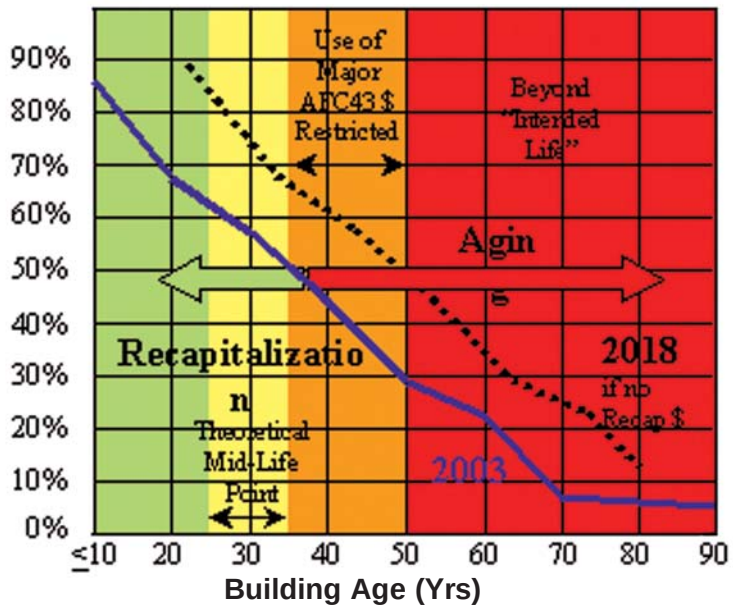
Figure 1. Capital Acquisition/AC&I Funding.[3]

As shown in Figure 2, half of existing facilities will be over 50 years old in 2018. Lacking appropriate CA funding, even the best management strategies will lose effectiveness as the facilities become older and more deteriorated. Although targeted divestures have reduced the size of the shore facility inventory, much of the "low-hanging fruit" has already been identified and "picked." While the AFC-43 threshold was raised by $150K, constraints placed on the nature of the AFC-43 work allowed (based on cost and asset age) have reduced the perceived flexibility provided by the overall increase.

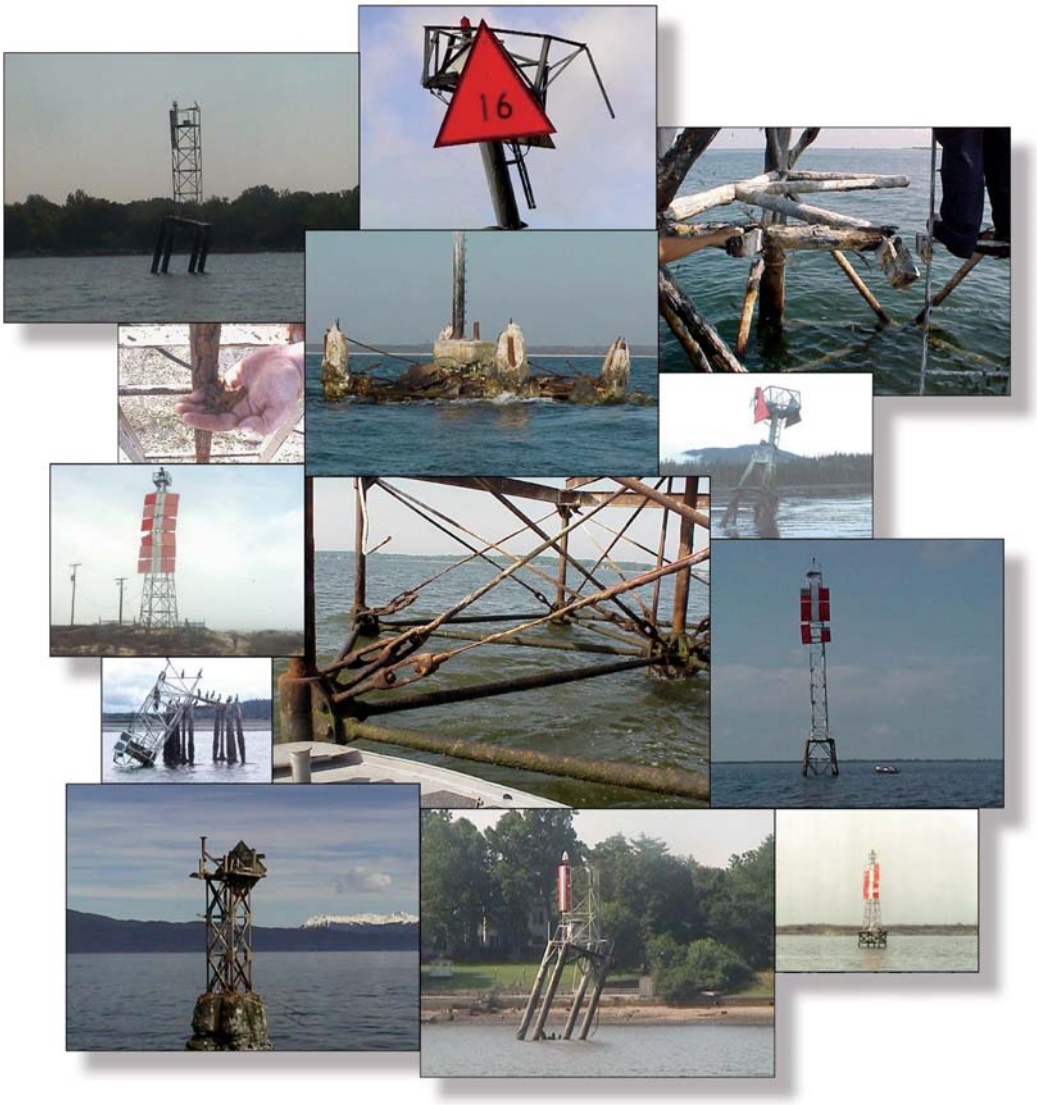
In an effort to quantify the dollar costs and potential execution timelines associated with Atlantic Area recapitalization requirements, Maintenance and Logistics Command Atlantic has initiated a strategic analysis of the Atlantic (LANT) Shore Facility Inventory. By comparing current AFC-43 funding constraints against LANT facilities' ages and costs, the analysis has identified approximately $1.4 billion in potential CA-funded recapitalization requirements. Compilation of the data is still underway, however, the initial outlook is that the data will prove useful to both document overall recapitalization requirements and evaluate potential strategies for management of the aging Atlantic Area shore plant.

Proper stewardship of our aging shore facilities can only be accomplished through combined recapitalization and divestiture efforts. As such, we must balance the use of Capital Acquisition funding for new requirements as well as the recapitalization of our existing facilities. Specifically, the CA account also funds construction of new facilities (i.e., in support of Home Land Security missions), expansion of existing facilities (i.e., to accommodate new, larger platforms such as the 47-foot Motor Life-Boat), and many other non-recapitalization projects. Given the high visibility of Homeland Security initiatives and the immediate operational impact of platform-shore facility incompatibility, it is clear that these types of projects will continue to compete with recapitalization needs for the available shore CA funds. One of the ways that the CG is dealing with these challenges is by identifying and funding new facility requirements within the CA projects that drive these new requirements. Shore facility needs required by the Deepwater project have been part of their planning process since the start of that project. Stewardship of our CG shore facilities will be achieved through continued divestiture of least needed facilities while we continue to pursue budget solutions to our shore recapitalization needs.

Figure 2. Age of CG Building Inventory.



[1] http://www.uscg.mil/hq/g-a/deepwater/back.htm.
[2] Usually 25 to 35 years of age, as defined in G-SEC memo 11000 dated 27 Nov 2002.
[3] Data from G-SEC-1 web site: http://cgweb.comdt.uscg.mil/g-sec/sec/1/Planning/SFRL.htm.



ATON Maintenance Backlog

by LTJG Kevin Wallace
Office of Civil Engineering (G-SEC)

As members of the Coast Guard and the Coast Guard family, we all realize how important the waterways are to the nation. With the transport of people and goods that contribute $1 trillion to the Gross Domestic Product and 13 million jobs nationwide, it is important (and the law) for us to provide the necessary navigational aids to ensure the safe transit of maritime traffic. If we fail to provide a reliable navigation system to mariners, the consequences can be catastrophic. The environmental and economic impact of a tanker vessel that runs aground resulting in a breached hull can last years into the future.

The Acquisition, Construction & Improvement (AC&I) Waterways program is the instrument the Coast Guard uses to expand and improve the Aids to Navigation (ATON) infrastructure, and to carry out significant repair and replacement projects for existing aids. Waterways projects result from changes in waterway usage, establishment or extension of waterways by the Army Corps of Engineers, or identification of inadequacies in the existing ATON system. Projects are also identified in Waterways Analysis and Management studies, which are periodically conducted on every waterway Coast Guard-wide.

As shown in the chart, the Waterways backlog has grown steadily over the years and is now in excess of $32 million. The program managers at Coast Guard Headquarters are faced with

the challenge of addressing this huge backlog with an AC&I Waterways appropriation that has averaged only $5 million per year. The results of the backlog and the lack of adequate AC&I Waterways funding are readily apparent. As the pictures in this article show, our navigational structures are falling into a state of disrepair and becoming safety hazards for our servicing personnel.

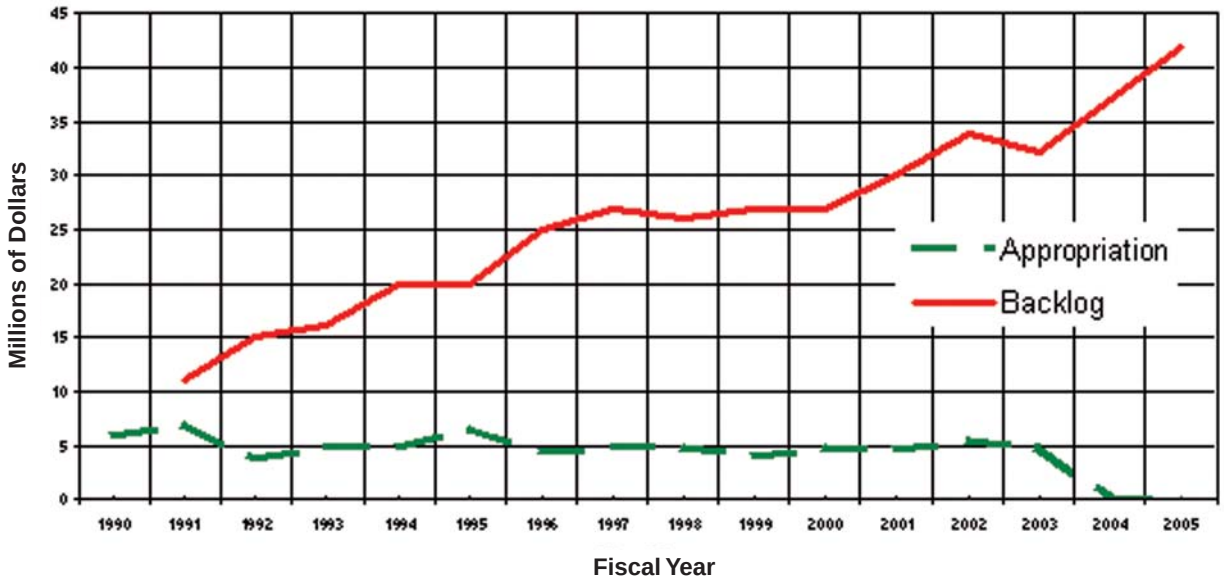
The Waterways infrastructure is in urgent need of increased funding for the replacement of aging structures. Without additional funds, the money we do have will by necessity go toward putting out the immediate fires instead of planning for the out years. A prime example is last year's catastrophic collapse of District 5's Deepwater Range, which forced managers to divert funds from other planned projects to replace the structure. Unfortunately, rather than looking forward to increased funding, the fiscal year 2004 budget actually has no funds appropriated for AC&I Waterways projects.

Measures are in place to help alleviate the burden of the AC&I Waterways program to replace ATON structures. The recent Fiscal Year 2003 increase in shore maintenance base funding (Allotment Fund Control Code (AFC) -43) will serve to better address routine and depot level maintenance. The increased level of maintenance will help to prevent the deterioration of aids prior to the need for replacement through the AC&I program. A properly maintained aid will provide the required signal for the mariner, and equally important, ensure the safety of Coast Guard personnel who work on these aids.

There is a Resource Proposal (RP) in the works for Fiscal Year 2005, which requests $14 million to begin closing the backlog gap. Approval of this RP would allow the Coast Guard to (1) fulfill our responsibilities under 14 USC 2 and 14 USC 81 to properly mark the nation's waterways; (2) support the U.S. Marine Transportation System; (3) respond to Army Corps of Engineers projects that shape commercial arteries and contribute $1 trillion to the GDP; (4) maintain the 99.7% availability of the short range aids to navigation constellation; (5) promote safety of servicing personnel; (6) reduce the transportation risks of grounding and collisions; and (7) improve transportation efficiency. In addition, the Coast Guard is exploring with the Army Corps of Engineers the possibility of wrapping the ATON construction funding into a single overall appropriation for a given Corps project.

In the meantime, it is critical that no service member get injured while working on an aid to navigation. If a structure appears unsafe to climb, do not climb it. Communicate the need for repairs to your cognizant Civil Engineering Unit via the Shore Station Maintenance Record (SSMR) process, or Casualty Report (CASREP) the structure if necessary. ST

Waterways Funding Gap



Sitka Land Swap

by LCDR J. A. Healy and
CDR V. K. Holtzman-Bell
Civil Engineering Unit Juneau

The Sitka Airport Expansion project called for the Coast Guard to transfer the parking area currently leased to the airport in addition to the Air Station's deluge pond and the old Exchange/MWR building. The State of Alaska intended to use this land for commercial "lease lots" at the airport. In this picture the MWR building has already been demolished and the new fire suppression system constructed.

Civil Engineering Unit Juneau is just now accepting two facilities from the State of Alaska's Department of Transportation (AKDOT) that were provided in a land exchange. These facilities replace obsolete and deteriorated facilities with new state-of-the-art improvements. These projects would never have "competed" for Acquisition, Construction & Improvement (AC&I) funding but the "land swap" became the avenue for improvement.

To accomplish this project, special language was included in the Fiscal Year 2000 (FY00) Coast Guard appropriation to allow us to have these replacement facilities constructed by AKDOT as part of the Sitka Airport Expansion project.

"That not withstanding any other provision of law, the Commandant of the Coast Guard may transfer certain parcels of real property located at Sitka, Japonski Island, Alaska to the State of Alaska for the purpose of

Old MWR Facility.
This wooden structure once held a Coast Guard exchange. When the CGES activity closed, the spaces were used for a small fitness facility and club activities.
The quality of the facility was "substandard."

airport expansion, provided that the Commandant determines that the Coast Guard has been indemnified for any loss, damage, or destruction of any structures or other improvements on the lands to be conveyed. No other provision of law shall otherwise make the real property improvements on Japonski Island ineligible for federal funding by virtue of any consideration received by the Coast Guard for such improvements."

In a lean AC&I budget, community support buildings simply don't compete with facilities that are essential to the mission. The new club and fitness center have certainly enhanced the quality of life in Sitka. The "pond" water deluge system for the hangar was hard to maintain and the pumps were in need of replacement. The "tank" foam deluge system represents a significantly easier system to maintain than the water system.

The State needed the land under our existing facilities, so they replaced the facilities within the new fence line. AKDOT spent $1.5M to replace our deluge pond with a new foam system (tanks and pumps) and the old MWR building with the new Eagle's Nest Club and Fitness Center.

The process of working with the State and its contractor was not a simple one. The State represented a middleman with little interest or expertise in the type of facilities being built. Working through the State turned out to be a very time intensive project. Negotiations for the land swap began in 1997. Three years later, there was language in place allowing for the action to occur. Now, three additional years later, we are taking possession of the facilities.

The facilities are much improved over what they replaced. The cost to the Coast Guard was small in dollars but not in effort. The effort in planning, negotiating, designing and construction was extensive and time consuming.

There is a tradesman in Juneau who displays this sign: **"You can have it FAST. You can have it CHEAP. You can have GOOD quality. But you can't have all three. PICK TWO!"** It's true in any world of work, but we have found it to be especially true with regard to this project. Our trade off was time … BUT given the AC&I outlook, these facilities were delivered years ahead of when we could have expected AC&I funding.

New Eagle's Nest Fitness Center and Club.
The new MWR building was designed by Facilities Design and Construction Center Pacific as part of the Coast Guard Air Station Sitka land swap. The facility includes a club and a fitness center.

Deluge Pond.
The 500 sq. ft. pre-engineered light steel and wood building houses three large diesel driven fire (water) pumps that provided deluge sprinkler water for the hangar. The facility, built in 1976, was in need of replacement.

Foam Deluge System.
The building in the foreground houses two fire pumps and mixing system for foam and water. The large tank in background contains required water storage for the hangar's fire suppression system.

CONTRACTING for SUCCESS

A Users Report of the GSA Area Wide Energy Contracts

by Wayne Manning
Civil Engineering Unit Miami

Worn out chillers, deteriorating air handlers, rusty piping and dripping ducts have a history of becoming acute problems for Coast Guard Civil Engineers.

Civil Engineering Units (CEUs) are constantly challenged to provide quality products in as short a time as possible. At first thought, you may rightfully think, if something is worn out, replace it, simple -- right? If only this were the rule rather than the exception, our CEUs would have more hours to devote to other projects. Changed and unknown site conditions, engineering omissions and a host of other delays often cause long project completion schedules to become even longer.

Civil Engineering Unit Miami, tasked with replacing Air Station Miami's 90-ton chiller, air handlers, piping, valves, pumps and controls; and to redesign Air Station Clearwater's HVAC system to provide an energy conscious system to the dining and cooking areas, was aware and concerned about such delays and problems. Faced with difficult time constraints, CEU Miami decided to use the General Services Administration (GSA) Area Wide Contract to handle these two projects. We went with this type of contract method based on our past experience, with excellent results, of previous lighting retrofit projects. This GSA contract method is credited with providing energy efficient projects with high quality products while drastically reducing project duration times.

WHAT IS A GSA AREA WIDE CONTRACT

Congress recognized the burdensome requirements of the federal procurement system as an obstacle to federal agencies attempting to comply with the mandated energy policies. In 1992, congress issued an executive order authorizing GSA to implement strategies to help federal agencies implement energy initiatives. Acting on this order, GSA put in place contracts with public utility companies to provide reliable sources for federal agencies to tap for their energy related procurements. The resulting GSA contracts include provisions for nearly every type of energy, water and demand side project possible. These contracts allow agencies to use select utility companies as sole sources for energy management services to include engineering, consultation and construction

of practically any energy related product. To help users determine if their project fits within the program's scope, the GSA help manual contains an extensive list of potential project types, e.g., air conditioners, chillers, lights, meters, heat pumps, weatherization and training, covered under this contract. By the way, energy projects are not required to have a payback to be eligible, and most energy-associated projects can be included in the scope of the contract. GSA provides a list of participating utilities and a user's manual on its web site www.gsa.gov/energy.

TWO STRATEGIC USES OF THE PROCUREMENT TOOL

Exercising the use of these GSA contracts, CEU Miami issued task orders for two major air conditioning projects during the summer of 2002.

Air Station Miami's administration building's chiller was on its last legs and was beyond economical repair. Florida Power and Light Co. convinced us they could do the job, deliver on time and guarantee the performance. Florida Power and Light (FPL) submitted a proposal to replace the chiller, pumps, piping and air handlers - the chiller would be the newest and most efficient available. All the piping, valves and accessories in the chiller room would be removed and replaced with new products. The proposal was being reviewed as the South Florida seasonal high humidity set in on the Air Station's buildings, causing sweating floors, damp draperies and generally swamp like conditions. We met with FPL at the Air Station to finalize the scope. Within a few days CEU issued a task order -- including a temporary chiller. The temporary chiller was installed over a weekend even as the written task order was being finalized. The humidity problems began clearing providing relief for the station's personnel. The FPL project staff expedited the engineering design and ordered equipment -- the project was off and running on a course to set a precedent for overall expediency. Even with a short-staffed CEU Miami, construction was completed on time. CDR Bruce Herring, facility engineer, praised the work of the mechanical subcontractor and the construction management. FPL did exactly as they represented and more.

Air Station Miami.

LCDR Bruce Herring is shown an access port to a new circulating pump on the 90 ton chiller system.

FPL project manager John Nix (left) and CEU Miami's PM Wayne Manning celebrate at A/S Miami in front of the new 90 ton chiller.

Air Station Clearwater.

The high humidity conditions were causing more grief, this time at Air Station Clearwater's Subsistence Building. The HVAC system needed replacing to a more efficient and economical unit. The concept brief carried a preliminary estimate of $450K, and construction time estimated at six months. CEU Miami unexpectedly lost the lead designer and project manager. Already short in the mechanical design department, CEU Miami turned to Tampa Electric Company (TECO), the holder of the local GSA Area Wide contract to supplement engineering resources. During a meeting at Air Station Clearwater, we identified the problems and established the confining parameters. The Coast Guard desired a short construction duration with a fixed construction time period. A few days later CEU received a proposal for a complete turnkey project. TECO's design, construction management and construction for this project would cost $300K and be finished in 4 months. TECO's engineers used innovative hood ventilation techniques requiring smaller blowers, and drastically smaller tempering units to achieve energy efficiency. The entire project would yield a payback due to energy cost avoidance. Not only did the total project cost less than originally anticipated, every phase of the project was accomplished in less time than we usually experience.

CEU Miami realized tremendous savings in staff time by embracing the use of the GSA Area Wide contract. Most of the usual work required in the procurement process was avoided by using the relatively simple task order procedure. "It's very simple," said Sherry Dague, Contracting Officer, "the amount of paperwork is less than for a small purchase order." Because the utility companies subcontract privately, the engineering plans are less rigorous and less costly than specifications we devel-

op for our government contracts. The timelines for both projects were drastically reduced, savings coming from procurement time, engineering time and performance time.

WHY WE LIKE THEM

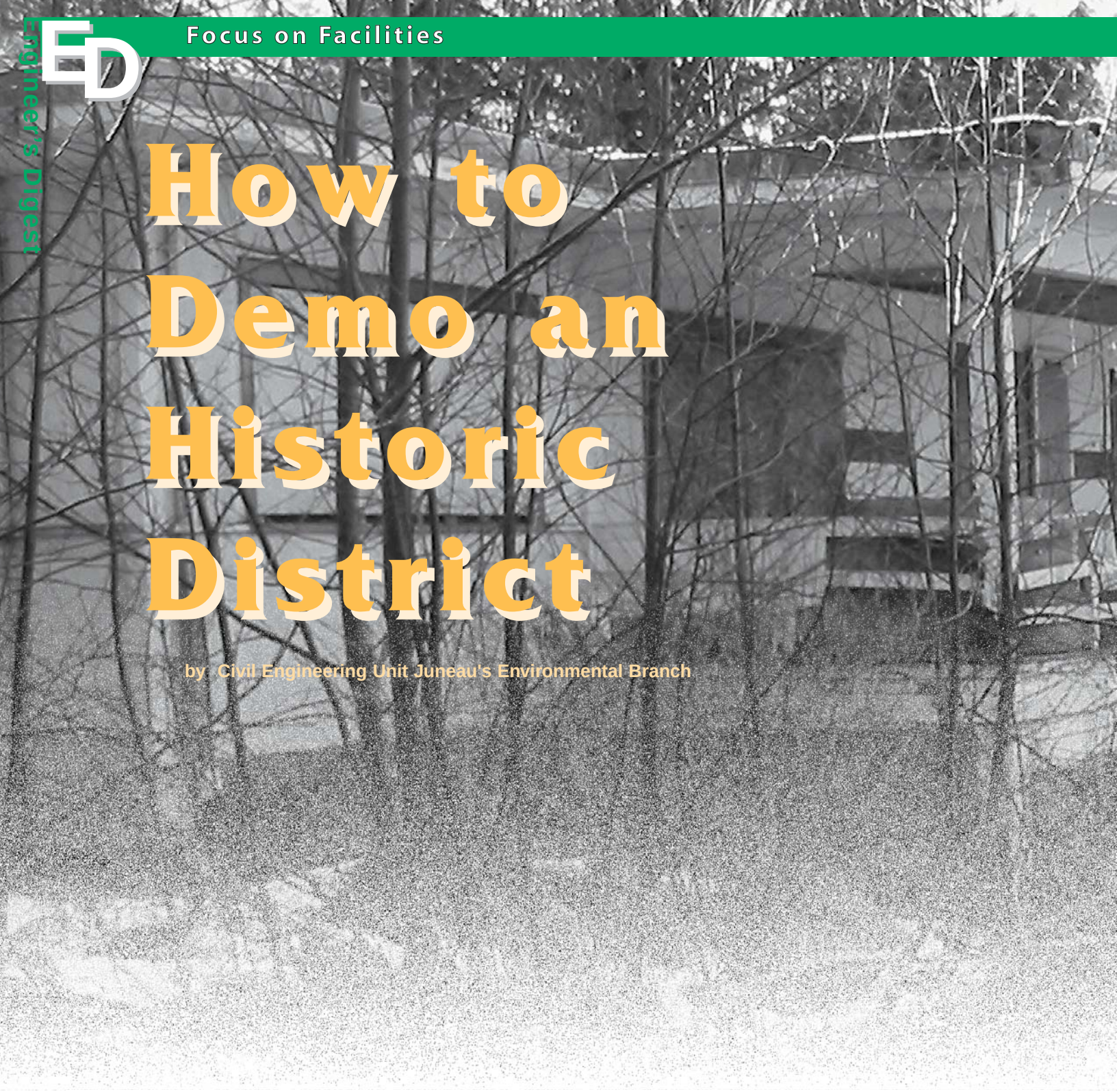
Both Florida Power and Light and TECO are private companies attempting to expand their businesses by offering construction and engineering services to their customers. Their long term standing and asset base put them in position to provide customers with high quality providers and guaranteed satisfaction. When asked what contracting method provides the best product for the Coast Guard, Construction Manager, CWO Ron Holzinger said, "The FPL/GSA contract is definitely the way to go. They took care of everything." Praise also came from LCDR Bruce Herring, Facility Engineer at Air Station Miami, citing the GSA/FPL method as "excellent" for the Coast Guard and noting the contractor was extremely cooperative, providing a complete and reliable system. They pride themselves in offering their service, guaranteed to work as presented.

SUMMARY

Because CEU Miami used the GSA Area Wide contract for lighting retrofits, energy audits, and major air conditioning renovation we experienced the following:

- ✔ REASONABLE CONSTRUCTION COST
- ✔ LOW ENGINEERING COST
- ✔ PROJECT DURATION OPTIMIZED
- ✔ LOW ADMINISTRATION EFFORT
- ✔ EXCELLENT USER FEEDBACK

With our production capacity reaching its limit, we found that the GSA Area Wide contract provided us with another option in which to expand our design and construction capability. Overall we found these contracts provided the Coast Guard a superior degree of satisfaction and cost savings, and we fully expect future uses to be equally rewarding.



How to Demo an Historic District

by Civil Engineering Unit Juneau's Environmental Branch

This is the story of how Civil Engineering Unit (CEU) Juneau demolished Point Higgins, an historic radio station in Ketchikan, Alaska.

Radio Station (RADSTA) Point Higgins was built in 1942 and operated as a radio station for 35 years. It was decommissioned in 1977 but remained in Coast Guard possession due to the requirement to maintain a buffer zone around the existing HF antennae to minimize the potential for electrical interference. The concrete and wood buildings (nine of them) quickly fell into disrepair in the harsh, wet Ketchikan environment. Because the site was in a remote area the Coast Guard had limited control over it, so vandalism became a problem as well. A favorite battle scene for paint ball enthusiasts, the buildings contained friable asbestos, peeling lead paint and severe structural deterioration -- clearly dangerous conditions that posed a threat to the users, and a liability risk to the Coast Guard.

Funding to demolish the buildings became available in Fiscal Year 2002 (FY02). One of the first steps in the project process was to determine whether the buildings were historically significant, a requirement under the National Historic Preservation Act (NHPA) Section 106 as stewards of a potentially historic resource. To do that we consulted with the State Historic Preservation Officer (SHPO). Somewhat to our surprise the SHPO determined that all of the buildings constituted an Historic District due to their role in both WWII and the Cold War. A *district* is a geographically definable area possessing a significant concentration of buildings, structures, sites, or objects united by past events or by plan or physical development. In addition, the collection of buildings must retain the seven aspects of integrity: *location, design, setting, materials, workmanship, feeling and association*. To be eligible as an individual building, the building would have to retain both integrity and be individually significant as a structure. The Coast Guard at first concluded that only one building

(Operations) was eligible, but not the entire group; the SHPO did not concur. The Coast Guard then agreed that all of the buildings (except the Commanding Officer's quarters built in 1961) constituted a district eligible for listing on the National Register of Historic Places.

The next step was to determine if there was an *undertaking*, and if so, if there was an *adverse effect* on this historic resource. An undertaking is any federal action, federally funded action or action over which a federal agency has oversight. Undertakings that are anything but administrative in nature must be judged for adverse effect on a historic resource. There are guidelines in the regulations for making this determination, but suffice it to say, the proposed action was total demolition of the buildings, so the adverse effect criteria were clearly met.

Since we obviously were going to have an adverse impact on the district, we needed to find ways to *mitigate* those impacts. Using National Park Service guidelines, and after talking to experienced historians, we established some draft mitigation measures that included doing simple site sketches of the buildings, and documenting them using large format photography. We also contacted the local Ketchikan historical societies, the borough planners, and the tribal corporation, by mail, to see if they had any comments on our proposed adverse effect. None did.

We wanted to get the SHPO to buy off on our proposed mitigation plan. To streamline the process we elected to establish a Memorandum of Agreement (MOA) with the SHPO which greatly reduced the number and duration of multiple reviews that would normally have to take place. The MOA also established the "ground rules" for our negotiations and established that as the federal agency we had control of the process and had the ultimate decision authority (some SHPO representatives need to be gently reminded of who is in the

Radio Station Point Higgins in disrepair before demolition.

driver's seat on this effort …), though we needed to make a good-faith effort to meet their requirements.

Once we had reached a negotiated settlement with the SHPO we proceeded with the mitigation plan. We hired a qualified architectural historian to oversee the required documentation of the buildings. The field work took about a week, including site preparation (cutting down several dozen sapling trees) to allow photography and site drawings to be completed. The documentation has been reviewed and approved by the SHPO and is being placed in the National Archives and the Ketchikan City Museum.

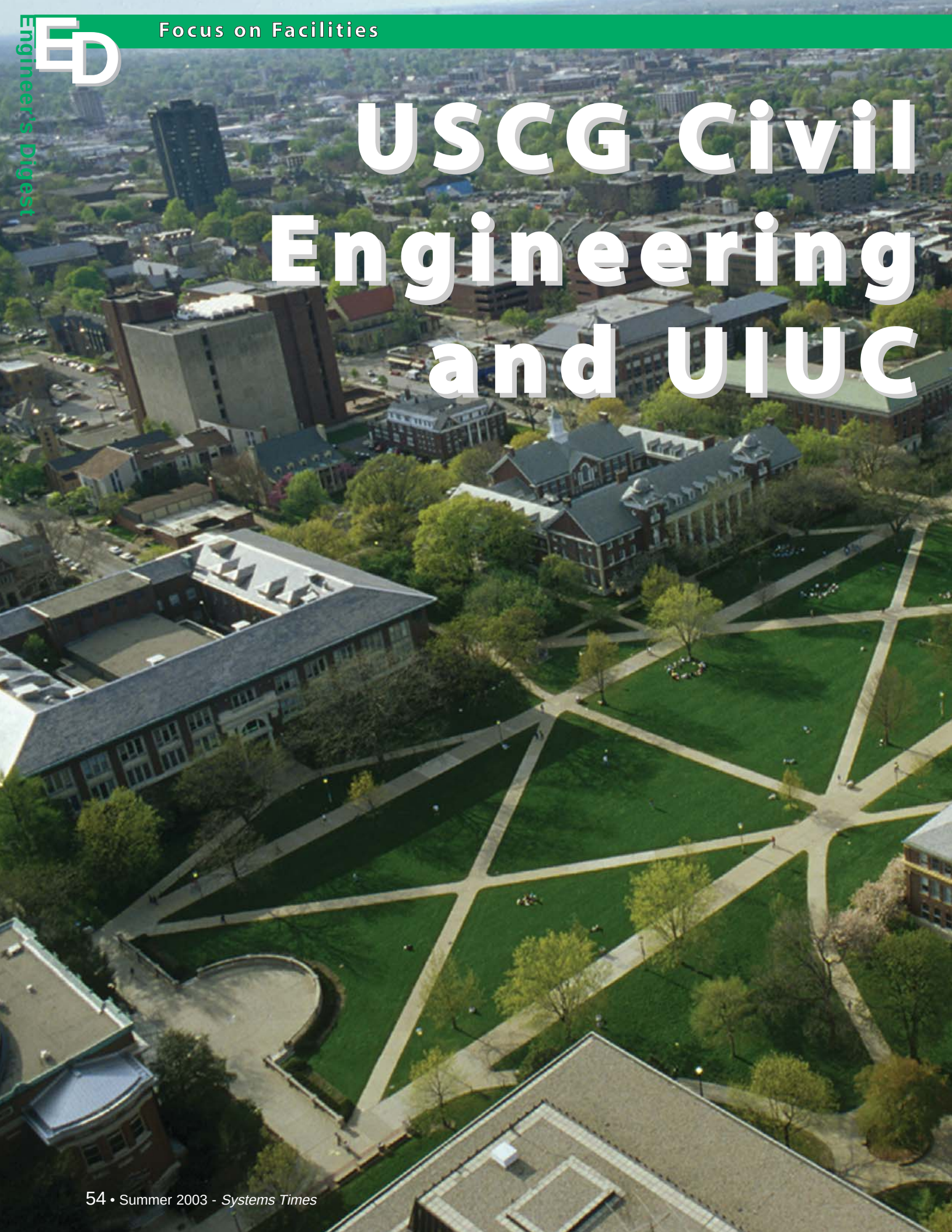
The SHPO effort was only one hurdle to be cleared. The requirements of the National Environmental Policy Act (NEPA) also had to be met. Since the proposed project did not meet any of the Coast Guard's approved CATegorical EXclusions (CATEXs), an Environmental Assessment (EA) was prepared for the project. As part of that process we had to make public notifications and consult with all other resource agencies that might have jurisdiction over the area. *The Ketchikan Daily News* did an article on Point Higgins and the proposed demolition project. We did not get any comments. Finally, we asked the Corps of Engineers to perform a wetlands jurisdictional determination for the project, since most of the building pads appeared to be in or near wetlands. Their conclusion was that as long as we stayed within the building footprints, there would be no wetlands issues.

With the SHPO and NEPA requirements met, we had the green light to demolish the buildings. We hired an 8a contractor and this piece of history was reduced to bare ground (and some nice drawings and photographs) in a matter of days.

How can you demolish an Historic District? It seems impossible. But like the old question, How do you eat an elephant? The answer is, one bite at a time. ST

Demolition of Radio Station Point Higgins.

USCG Civil Engineering and UIUC



by Celeste Arbogast Bragorgos
CEEAA newsletter editor
University of Illinois at Urbana-Champaign

A bird's eye view of the University of Illinois at Urbana-Champaign's campus.

A tour of duty in landlocked central Illinois might seem an unlikely assignment for an officer in the U.S. Coast Guard. Even so, for nearly 40 years post-graduate training at the University of Illinois at Urbana-Champaign (UIUC) has been an important facet in the professional development of Coast Guard civil engineers. Selected by the Coast Guard in the mid-1960s because of its reputation as a top civil engineering school, UIUC has long been the training ground for Coast Guard men and women who, on the road to becoming full-fledged civil engineers, first became Illini.

The University of Illinois has long been recognized as a leader in civil engineering. At the time the Coast Guard was selecting a new location for the postgraduate civil engineering program previously conducted at Rensselaer Polytechnic Institute in Troy, New York. The University of Illinois enjoyed an international reputation with renowned faculty members like Hardy Cross, Nathan M. Newmark, Ralph B. Peck and Chester P. Siess. Coast Guard representatives CDR J. J. O'Meara and LCDR H. A. Paulsen, Jr., held a series of consultations with Illinois Professor John W. Briscoe and relocated the postgraduate program to Illinois. The resulting partnership has now spanned nearly four decades.

The first Coast Guard officers to attend Illinois, arriving in 1965, had gone through the Coast Guard Academy before a specific civil engineering degree was offered. After graduation from the Academy, they generally spent several years on sea duty and other assignments before declaring a specialty and applying for postgraduate training. The objective

of the postgraduate program from the outset was to provide officers with a broad, technical base in civil engineering to prepare them for what were essentially engineering management positions in the Coast Guard's shore facilities program. Then, as now, civil engineering officers were encouraged to pursue licensing as professional engineers. With general engineering degrees from the Academy, these officers had enough basic courses to earn bachelor's degrees in civil engineering after just three semesters at Illinois. Carl H. Burkhart was among the first class of five Coast Guard officers. He came to Illinois after graduating from the Academy in 1962 and completing three years of sea duty stationed out of Boston.

"The best part of the education for me was its well-rounded nature and fast pace," Burkhart says. "We studied steel, concrete, roads, sewage, surveying, strength of materials, operations analysis, soil mechanics, computer programming, geology, advanced math, basic architecture and more, all in a 17-month period. It gave us the basic tools to address any problem thrown at us as we later managed the facilities engineering program of the Coast Guard."

In the early 1970s, the Academy established its own civil engineering curriculum with the help of Illinois alumnus LCDR Larry D. Brooks, who was assigned to the faculty there in 1970. Brooks visited Illinois repeatedly and worked closely with Illinois Professor John D. Haltiwanger, advisor to the Coast Guard postgraduate students, to model the Academy's program and facilities -- such as its new soil mechanics lab -- after Illinois' and align the two curricula.

Newmark Civil Engineering Laboratory located on the campus of the University of Illinois at Urbana-Champaign.

"I sat down with John Haltiwanger on many, many occasions and compared the programs line for line, so that he wouldn't blink when one of our people applied," Brooks says. "He knew the program they went through and if they got through it, they were basically in at Illinois."

As civil engineering offerings expanded at the Academy, officers began arriving at Illinois with more extensive academic backgrounds in civil engineering. By the mid-1970s, most were able to fulfill the university's requirements for a master's degree during their time in Urbana-Champaign. A growing desire among many of the officers to earn master's degrees, rather than a second bachelor's, had led some to work toward a graduate degree even before the Academy began its civil engineering program. Brooks himself had been one of two officers in the class of 1968 at Illinois who lobbied headquarters for a chance to stay one more year at Illinois to earn master's degrees in addition to their bachelor's degrees. Professor Haltiwanger, now a professor emeritus, endorsed their effort.

"They asked me if I would support them, and I gladly did," Haltiwanger says. "We worked out the program so that these guys, by taking ridiculously heavy loads as undergraduates and then going one more summer term, could get a master's degree. They were bright, driving people, they decided they could do it, we made the case, and they pulled it off."

Today most Coast Guard officers earn master's degrees during their time in Illinois, although the stated objective is not the degree itself but rather advanced technical education and the development of "a professional acumen to meet current and future needs of the Coast Guard," according to the *Civil Engineering Program Postgraduate Objectives* published in September 2002. The program has evolved throughout the years to reflect the changing needs of the Coast Guard, changes in the Illinois curriculum and developments in the field, such as a growing emphasis on environmental engineering. Officers are now expected to develop their professional expertise in technical areas of civil engineering, as well as less traditional areas of planning, management, business, finance and information technologies. In meeting the expectations of the Coast Guard postgraduate program, most officers exceed the university's requirements for a master's degree, says postgraduate program manager LCDR James J. Dempsey. The curriculum is carefully monitored to ensure it meets Coast Guard needs, but officers have more latitude in choosing classes than they once did, Dempsey says.

"Generally they leave with the most expansive understanding in structural and geotechnical engineering, but basically they need to find their own niche," Dempsey says. "We're not saying it has to be structural or geotechnical. Environmental, facilities management, capital asset management, construction management and the traditional technical fields of civil engineering are all acceptable areas."

In nearly 40 years, just three different professors have acted as advisors to the Coast Guard students at Illinois, who have numbered eight to 12 at any given time. Professor Haltiwanger served as advisor until 1980, when Professor William H. Walker, now a member of the emeritus faculty, assumed the duty. In the late-1990s, Professor and Associate Head Frederick V. Lawrence took over from Walker. Because of his work with the Coast Guard program over the years, Professor Haltiwanger was awarded the USCG Public Service Commendation in 1974, the Bliss Medal of the Society of American Military Engineers in 1980, and the USCG Meritorious Public Service Award in 1984. He served as a member of the Academy Academic Advisory Committee from 1980-83. His office wall bears a special gift: a framed photograph of a Coast Guard cutter with an engraved inscription expressing the gratitude of a Coast Guard student for Professor Haltiwanger's support during a particularly challenging semester. Richard C. Sasse, who earned a bachelor's degree from Illinois in 1975, is among many Coast Guard Illini who remember Professor Haltiwanger as a strong student advocate.

"We'd listen to him on the phone -- he'd be talking to the professor of some course -- and he'd say, 'Well, I've got some Coast Guard students, and they're older and they're motivated and I can assure you that these students will not let you down,'" Sasse says. "And he'd hang up and say, 'You're all set.'"

"We had a special deal, there's no question about it," says David A. Hough, who earned a bachelor's degree at Illinois in 1967. "The University of Illinois just loved Coast Guard people, and the Coast Guard people just loved the University of Illinois.

The Coast Guard students came to the equation extremely prepared to study. We were the kind of people who sat in the front of the class and always participated, so it made it easy for the instructors."

The professors agree. Over the years, the Coast Guard men and women distinguished themselves as a particularly disciplined and hard-working segment of the student body, say professors Haltiwanger and Walker. They were enthusiastic and involved, participating in student organizations like the concrete canoe team and activities like Engineering Open House, an annual, student-run event showcasing the university's various engineering departments. Professor Haltiwanger recalls with amusement a particular year in which the department's displays for that event were very modest and clearly not destined for university-wide recognition. Determined that their fellow students not go unrecognized for their efforts, some of the Coast Guard officers took matters into their own hands.

"On Saturday morning I came in the front door and there were three Coast Guard officers standing there," Professor Haltiwanger says. "They picked me, and then another faculty member came in, and they buttonholed him, and they wound up with three of us. They said, 'You guys are the judges. We're going downtown to buy some ribbons.' And they came back with some blue and red ribbons, and we gave our own awards! It simply speaks to the dynamic, enthusiastic and committed nature of some of these guys."

"The enthusiasm and drive of these people undoubtedly affected the other students. It would have to; it could not be otherwise. They didn't separate themselves. They didn't walk around in a Coast Guard group; they simply became part of the student body- a very competent, enthusiastic part of the student body."

Professor Walker remembers the military discipline of the Coast Guard students, a quality they sometimes had to temper in the civilian university environment.

"For a number of years I taught the steel design course that most of the Coast Guard officers took," Professor Walker says. "In later years, I always had a full-blown project scheme where we divided the class up into project teams, and I got a kick out of it,

UIUC Professors from left to right are Bill Walker, John Haltiwanger and Fred Lawrence standing in the university's crane bay.

particularly if there was a Coastie who had just come to campus after leaving command of a cutter. He would always wind up as leader of a team, and I would often need to have a chat with him: 'You know, you've got a bunch of 19- and 20-year-old college students here, and no, they're not going to respond like the crew of a cutter,' and he'd laugh."

As a group, the Coast Guard program alumni have distinguished themselves in countless ways. There are three Admirals among them and at least two authors. Many retired from Coast Guard careers to enjoy successful civilian engineering careers, armed with one of the most highly respected engineering degrees available. Many remember their time at Illinois as a key event in their lives, both professionally and personally. It was a time for these men and women in their early- to mid-20s to take a brief break from the military and enjoy the freedom of the university environment. In the 1960s, this was a particularly marked contrast from military life, says Hough.

"We were in the middle of the flower generation with the love-ins and things like that in the quad," he

says. "I didn't have the long hair because I had to have a military haircut, but I had the civilian clothes. My wife's first date was on the back of a motorcycle, and I had bare feet, you see."

John R. Wallace had recently returned from a tour in Vietnam when he joined Illinois' class of 1967. Wallace dove into the experience, volunteering to play Santa Claus for the pediatric wards of local hospitals at Christmas and even pledging the fraternity Alpha Delta Phi.

"I decided there were two ways I could do it --I could be an outsider, or I could be an insider," Wallace says. "I saw a part of college life and a part of the experience that normally somebody in a military structure like mine who went through an academy would never experience. I really look back on my time in Urbana-Champaign as one of the highlights of my life."

"If I could go back and do that again, boy, I'd do it in a New York minute," Hough agrees.

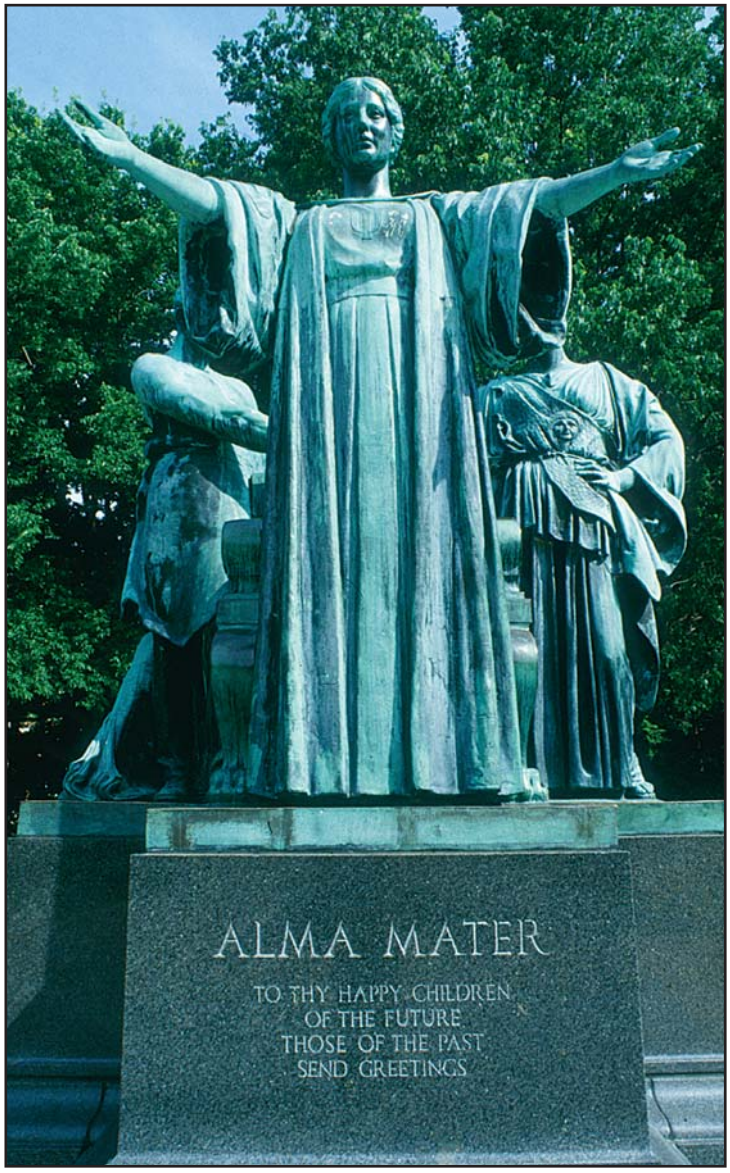
In recent years the requirement that Coast Guard officers attend UIUC has been relaxed, partly to give officers more choice with regard to geographic location and partly in response to the Coast Guard's growing need for officers trained in areas of specialization available at other schools. The majority who still choose Illinois have an expanding set of options open to them, such as a new joint degree program prototyped in 2000 at UIUC in which officers have the opportunity to earn a CEMBA, studying both civil engineering and management. Like other Coast Guard Illini before them, these officers find a sense of fellowship that has linked their predecessors over four decades.

CDR Virginia Holtzman-Bell, commanding officer of the Civil Engineering Unit in Juneau, Alaska, attests to the sense of community felt by the Coast Guard Illini. A third-generation Coast Guard officer and the first woman to go through the Illinois postgraduate program, CDR Holtzman-Bell earned her master's degree in 1985.

"One of the nice things about many of us being graduates of Illinois is you build up a feeling of fraternity," CDR Holtzman-Bell says. "Though I did not go to school at the same time as, let's say, CAPT [Patrick] Layne, who is head of civil engineering now, CAPT Layne did go to Illinois, and we can sort of laugh like anyone does about classes or remember some jokes that [Professor Mete] Sozen might have told or remember [Professor] Michael Darter being excited about some of the new technology that was coming out in pavements. We share that experience, we share that background, we share the philosophy that U of I taught. Illinois has become part of our culture. That is something that Illinois has given us."

NOTE: Are you a UIUC alum who wants the latest on UIUC Civil Engineering Department happenings? Then go to www.ce.uiuc.edu to find out all the latest info and current events.

Alma Mater stands on the UIUC campus.



Perspective

by LTJG Craig Foos
Office of Civil Engineering (G-SEC)

St. George Reef Light

From many vistas in the most northern region of scenic coastal California, a person can take in the magnificent sight of St. George Reef Light standing tall and proud. Built 111 years ago and deactivated in 1975, many lighthouse experts think of St. George Reef Light as the greatest lighthouse in America. Located six miles off Point Saint George in California, the lighthouse marks a hazardous reef that extends from the point to the lighthouse itself. St. George Reef light exists in an area known for its treacherous surrounding waters. As a matter of fact, during one storm in 1952 a wave swept over the top of St. George Reef lighthouse, shattering the windows in the lantern room 146 feet above normal water. The dangers of the reef compounded by the awesome seas have cost many mariners their lives including at least 166 people on board the BROTHER JONATHAN which sank in 1865 in what remains as California's worst shipwreck. The area is so perilous that it has earned St. George Reef light the unglamorous title as the most deadly light station in the United States, having captured the lives of four keepers and one construction worker. At 135 feet high and costing over $700,000 to build in 1892, St. George Reef Light was the most expensive lighthouse built at the time. What's more, after taking 11 years to build, it stands as the most prolonged construction project in American lighthouse history. During construction, the enormous structure consumed over 175,000 cubic feet of granite, 14,000 tons of stone, 1400 tons of sand, 330 tons of brick and 270 tons of gravel. First lit in 1892, the light stands for more than a marker to mariners indicating the dangers of the sea; it is a piece of Coast Guard civil engineering history that figuratively relates to Coast Guard civil engineering of today.

For decades Coast Guard lighthouses stood as symbols reminding the American public of the importance of Coast Guard facilities. Today, as lighthouses are being divested and navigation is by way of computers and satellites, it seems as though bricks and mortar are being replaced by signals and hard drives. However, just as the great engineering challenges of St. George Reef lighthouse are difficult to appreciate in a modern context, Coast Guard civil engineers face new, very different challenges of a comparable magnitude. The world has become increasingly complex and unfortunately dangerous. In addition to designing for natural threats, Coast Guard civil engineers must consider the un-natural acts perpetrated by those who would do us harm. Civil engineers must review existing facilities and design new facilities for force protection with no additional funding provided to meet this requirement. For civil engineers, strong business sense is as critical, if not more so, as technical competence in the building sciences. The ability to allocate scarce resources to mitigate risk to an acceptable level is a new and absolutely necessary way of doing business.

As we face the daunting challenges of the "new normal" it is comforting to look back at the seemingly insurmountable hurdles of our past. How many lives did we save by finding a way to build a lighthouse in a location that would make it the most deadly light station in the United States? How many lives will we save by hardening our facilities and successfully designing for the needs of being part of the Department of Homeland Security? These questions cannot be answered, but one fact is absolute, Coast Guard civil engineers have adapted and responded admirably to the varied challenges of the past. Tomorrow's challenges will be different than those encountered in the days of St. George Reef light, but the outcome will be the same -- we will overcome.

*For more information on St. George Reef light, please reference Ralph C. Shanks book *Lighthouses and Lifeboats on the Redwood Coast*.

Yard Built Cradles Used For Overseas Transport of 110' Patrol Boats

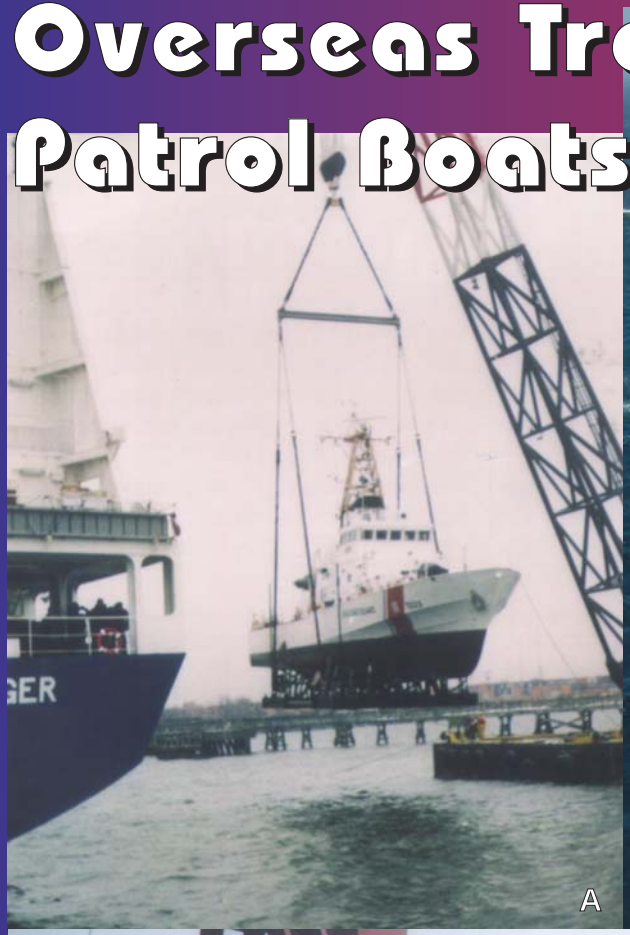


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Photo A: Secured in a Yard built cradle, a Coast Guard 110' patrol boat is lifted for landing and lock down on a commercial freighter bound for a transoceanic voyage in support of Operation Enduring Freedom. (Photo by CPO Walter Hay, USCG)

Photo B: Several 110' patrol boats are pictured positioned in Yard built transport cradles on board a Military Sealift Command contracted ship. The overseas deployment is in support of Operation Enduring Freedom. (Photo by LCDR Mark Lenassi, USCG)

Photo C: The motor vessel BBC SPAIN transported a second set of four U.S. Coast Guard 110-foot patrol boats in support of Operation Enduring Freedom. The USCGC DALLAS escorts the transport ship.

Operation Enduring Freedom

In the first overseas deployment of patrol boats for support of national defense since the Vietnam War, the Coast Guard recently ordered several cutters and crews to depart homeport and assist in Operation Enduring Freedom. On January 29th, the Coast Guard announced the deployment of eight ll0' Island Class patrol boats and two Port Security Units, totaling 600 Coast Guard men and women to support the global war on terrorism. Coast Guard patrol boats up and down the east coast received orders to deploy overseas. Assets included the Cutters WRANGELL, ADAK, AQUIDNECK, BARANOF, BAINBRIDGE ISLAND, GRANDE ISLE, KNIGHT ISLAND and PEA ISLAND. The Coast Guard's mission in Operation Enduring Freedom will provide waterborne and land-based protection for shipping and critical port facilities, search and rescue, port security, anti-terrorism/force protection, maritime boarding and interdiction duties.

Four ll0' patrol boats were the first to depart in January 2003. The Cutters were placed on cradles and loaded on a commercial freighter contracted by the Military Sealift Command for transport overseas. The Cutters' crews and support unit personnel flew over separately to meet the boats in the assigned areas of operations. Four more ll0' patrol boats departed in February of 2003.

the Coast Guard Yard played a key role in this deployment mission. Under a joint Department of Defense and Coast Guard project, Yard engineers and tradesmen designed, tested and constructed eight shipping cradles being used for the transoceanic crossing.

In the late l990s, the Yard manufactured this first-of-its-kind transport cradle. Successful testing of the prototype through shipboard transportation exercises followed and resulted in the Yard's construction of seven more cradles, ready for overseas deployment when the call came.

The Yard responded to the call from Operation Enduring Freedom and sent a road crew of 20 employees to Virginia to assemble the cradles on-site and assist with loading the patrol boats into the cradles and landing them onto the transport vessel.

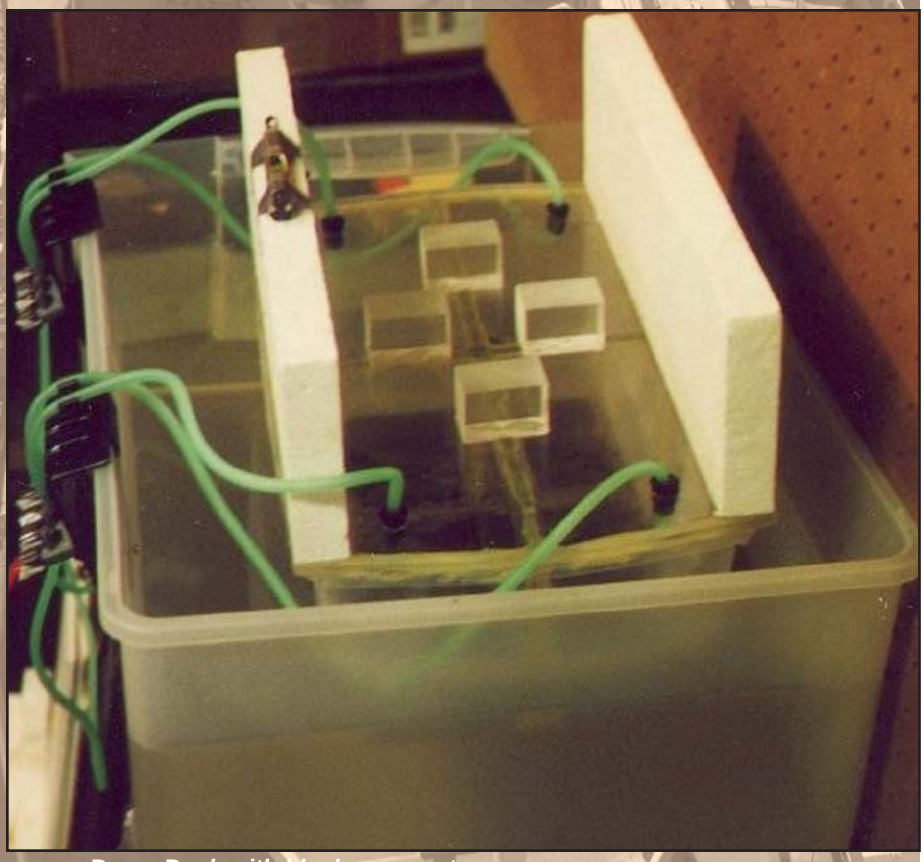
The Yard received the following remarks regarding the deployment from the Coast Guard Maintenance and Logistics Command Atlantic Area. LT James Novotny, Assistant Chief of the Small Cutter and Standard Boat Section, commented, "Please pass on my thanks to the Coast Guard Yard for the extraordinary effort provided by their … contingent during the recent on-load of four ll0s. They completed loading the cutters into the cradles in a single long day.

Early on in the day it became evident that if the cutters were to be strapped into the cradles correctly, we needed to play a major part in the process. The Yard workers took immediate action and began blocking the cutters and assembling the remaining parts of the cradles. When faced with the knowledge that the work had to continue throughout the night, they worked harder and solidified their resolve to stay until the four cutters were safely and completely stowed in their cradles. They decided as a team to stay on until the job was finished … and in the end, worked until l0 p.m. to finish the job. I am extremely proud of their can-do spirit, teamwork, and pride of accomplishment. It is fair to say that the successful on-load was a direct result of the Yard."

The Yard's support of Operation Enduring Freedom is best summed in the words of the transport cradle project manager, "We can now ship a ll0' class cutter anywhere in the world to meet the needs of Coast Guard operations. Thanks to the expertise of the Yard, we again prove our purpose to serve the Coast Guard fleet."

Working Models Bring Dry Dock Training to Life

by LCDR Steven Hendershot
Maintenance and Logistics Command Atlantic MLCA(vs)



Demo Dock with blocks on pontoon.

The Maintenance and Logistics Command Atlantic (MLCA) Naval Engineering Specifications Branch (vs) provides annual dry dock training to Naval Engineering Support Unit port engineers. Our training prepares port engineers to ensure that shipyards operate their dry dock safely. The course introduces port engineers to the various types of dry docks, their characteristics, advantages and limitations. The most common type of dock used by MLCA's contractors is the floating dry dock, which is also one of the most challenging to use. As a result, we emphasize the inspection and safe operating procedures of floating dry docks.

Training aids help demonstrate dry-docking principles and provide valuable hands-on learning opportunities. We use several manipulative tools to demonstrate such concepts as free-surface effect, metacentric height, trapezoidal loading and block stiffness. One of our favorite tools is the floating dry-dock model.

We started with a simple, wooden dry dock, a three-piece channel shape with some ballast but no moving parts. We floated it in a tub of water to demonstrate how the shape of a dock affects its stability. We added blisters to widen the wing walls,

demonstrating the effect of waterplane area on stability. This was the first-generation dry dock model. We then experimented with Styrofoam and even ultra-high molecular weight plastic (UHMW) to achieve a durable, waterproof model that behaved like the real thing. Not content with the static dock, we advanced to the working dock, also called the Visible Dock.

We built this second-generation dry dock model out of Rubbermaid, Styrofoam and Plexiglas with four individually floodable chambers or tanks in the pontoon. We ballasted and dewatered the tanks using vents in the tank tops with removable stoppers. Removing a stopper with the dock afloat resulted in tank flooding through holes in the bottom. Removing the stopper while lifting the dock drained the tank. The transparent pontoon allowed one to view the water level rising or falling in each tank and its effect on the dock's list and trim.

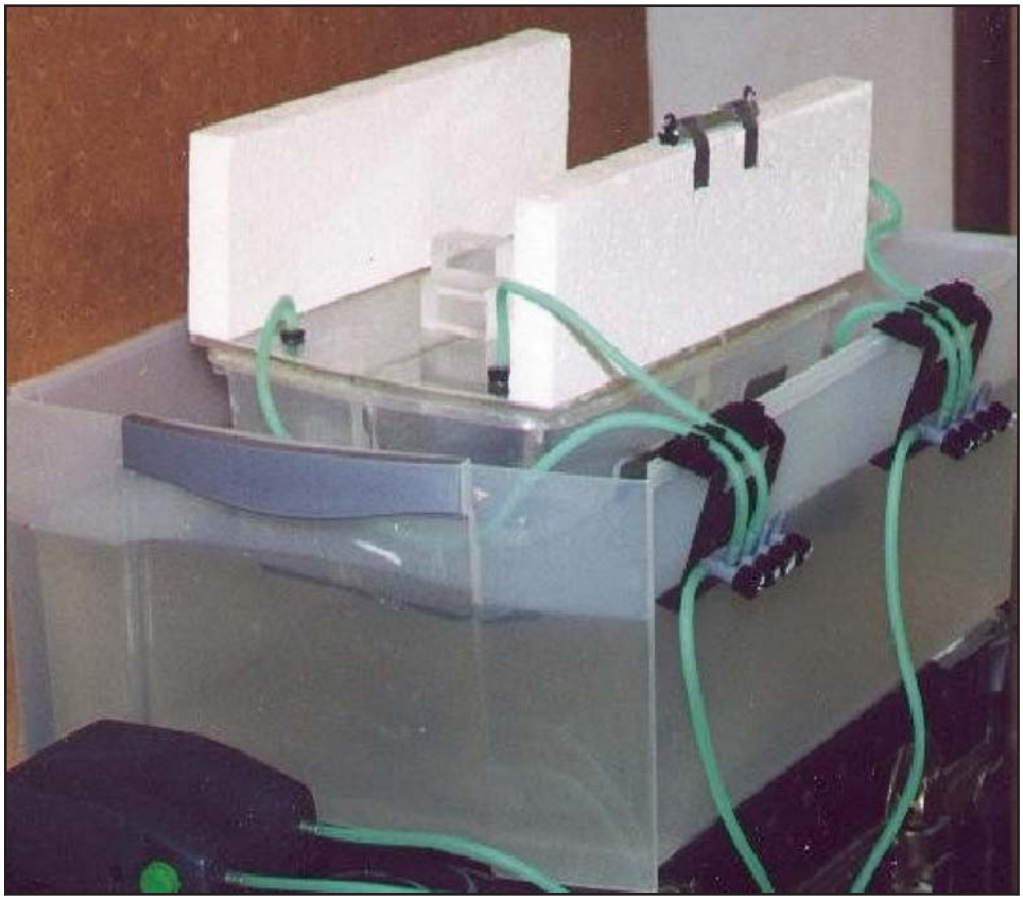
Handling the stoppers interfered with stability demonstrations, so we advanced to the third generation model by adding pumping power. We controlled this version pneumatically using an aquarium air pump and a set of miniature air valve manifolds. The manifolds provided hands-off control of the dock including raising, lowering, and correcting for list and trim. By now we were turning heads, and even lay people who had never found dry docks interesting were asking to see the Demo-Dock in action.

Still not satisfied with the home-made look of the Demo-Dock we prepared detailed designs for an all Lexan, bi-colored, three-sectioned, six-tank, pneumatic working dock. This dock, currently under development, will illustrate typical dry dock design features and the resulting operational constraints. The model will demonstrate the docking and undocking evolution; the stability of the ship-dock system at the various phases of the evolution; the importance of a proper pumping plan; the need to track weight shifts while a cutter is docked, as well as bending and shear stresses placed on dry docks; and how to monitor resulting dock deflection.

Course feedback tells us that these models help participants grasp important concepts, thus enabling them to monitor the critical steps in the preparation and execution of cutter dry-dockings. We believe that better training for port engineers results in safer dry-dockings; and that is just good stewardship.

As engineers, we can't resist continually pushing the design spiral, so we have conceived of a fourth-generation Mock-Dock that would be radio controlled and operate with internal miniature water pumps and servo-operated valves. It would be on hand to service any craft damaged at local Radio Controlled boat competitions. That might be a good project for next year.

Pneumatic system controlling dock.



Precision Pump Alignments

by MK1 Isidro Cartagena
Naval Engineering Support Unit, Portsmouth

It's 0630, the beginning of what you hope will be a carefree and spectacular day. Ten-hundred passes without a glitch. Then the phone rings, you answer, "Auxiliary Division, MK2" … "*#@%" says the MKC at the other end of the phone, "You're needed in the JP-5 pump room because the service pump is vibrating and sounds bad. We've neither the luxury nor the time for breakdowns on this pump again! There's a helicopter inbound and it needs refueling. We'll be able to refuel it upon arrival, correct Petty Officer?!!!"

Now what was to be a spectacular day starts spiraling downward because you've repaired that pump three days ago, but you weren't sure the alignment went well. If only there was an easier and more precise way to accomplish an alignment, instead of a straight edge or dial indicator, this would most definitely reduce time spent on equipment repairs and increase reliability.

MK2 High TECH, a TAD crewmember, noted your troubled expression from across the compartment, walked over and asked, "What's wrong and can I help?" You take a moment and explain the dilemma encountered and the difficulty you've had with the JP-5 pump and motor alignment. Today may be your luckiest day. "It so happens that the helo is my transportation to another cutter experiencing problems on several pumps. Ask the chief if I my assist you with aligning the pump, being that's why I'm going to the other cutter anyway. Besides, it will give me a chance to show you an easier and more precise method of aligning a pump and motor."

Since being stationed at Naval Engineering Support Unit (NESU) Portsmouth, I've received training on proven technology used to align pumps and motors to a higher degree of accuracy. It improves equipment reliability, and saves on repairs and down time; it's LASER ALIGNMENT Technology.

Let's examine the different methods of alignment and the level of accuracy achieved by each method. These tolerances are determined in the thousands of an inch or millimeter range of accuracy. For example, with a straight edge one can achieve an accuracy of about 0.0400 inches, with a dial indicator the accuracy is 0.0040 inches, where as with a laser alignment unit you can achieve 0.0004 inches, a much high accuracy. Anyone can learn the proper way of setting up and using this unit to accomplish a precise pump alignment. The Laser Alignment tool eliminates human calculation errors as it performs the math for the user. That includes consideration of thermal growth in aligning the equipment. Equipment shafts need only as little as sixty degrees of rotation to achieve good alignment results, it even helps identify PIPE STRAIN, which causes misalignment, or motor base deformities that create an effect know as SOFT FOOT.

The alignment tool has additional capabilities, which allow the user to enter manufacturer's target tolerances for couplings in use, which increase its usability. These are horizontal gap, horizontal angularity, vertical gap and vertical angularity. Say there's a pump mounted vertically. The Laser Alignment tool can achieve alignment results in this position too. In addition, by pushing two buttons you save alignment information to the control unit files for viewing or printing later. Using a computer program on a laptop or an office computer allows one to compare the results with other alignments and even print in text or graph format. The program provides the user a means to input equipment data into the control unit before ever setting foot next to the machinery requiring alignment. "Shall we complete the pump alignment? That way you can refuel my ride. I will send your Chief the information on this new Laser Alignment Technology, you're going to find it's great!"

Look for better ways to accomplish your daily tasks in order to stay competitive in today's maintenance field. Strive and acquire a higher degree or better method to accomplish precision alignments. A great advance for pump alignments is the LASER ALIGNMENT Technology.

Federal, State and Local Interoperability

by **Robert F. Salmon**
Office of Communication Systems (G-SCT)

The events of September 11th, 2001 have highlighted the need for the Coast Guard to be interoperable with other Federal, State and local law enforcement agencies. As a minimum, this interoperability is defined as the capability to communicate via wireless voice on a common command and control network.

Past experience has shown that first responders to multi-agency events often find themselves unable to talk to each other because of non-compatible communication systems (e.g., non-standard trunking systems, non-standard frequency plans, etc.). Consequently, the efficient response to emergency incidents can be significantly impeded if, during these events, emergency personnel have limited or no radio communications with each other.

The events of September 11th have served to blur the lines between public safety and national security, and have thrust Federal entities, such as the U.S. Coast Guard, Federal Bureau of Investigation and the U.S. Secret Service into broader public safety roles. Many Federal public safety entities must now be able to communicate directly with one another, and with their State and local counterparts that are also critical front-line defenders in homeland security.

The commercial industry has recognized the need for interoperability and is starting to make various electronic equipment to facilitate wireless voice interoperability. Such equipment can vary in capability and cost, but these systems fall into the general category of cross-band repeater systems, since they are designed to "repeat" transmissions, often on a different frequency band. Such systems can be deployed without requiring changes to existing radio systems, but can tie up channels which may be scarce, require additional equipment, such as radios and antennas, and may be limited by regulatory issues. The Office of Communication Systems (G-SCT), in cooperation with the Office of Command and Control Architecture (G-OCC) is researching various products and the associated policy and procedures through participation in several interoperability groups. The Office of Communications Systems (G-SCT) recently provided Interoperability briefings and product demonstrations for the Area and Maintenance and Logistics Command Electronics Systems Division (MLC(t)) staffs for both coasts.

The rest of this article highlights some of the work being done in the interoperability arena and describes current Coast Guard policy.

Public Safety Wireless Network (PSWN) Program

The Public Safety Wireless Network (PSWN) Program was formed to promote effective public safety communications and to foster interoperability among Federal, State and local communication systems. The PSWN Program is a Department of Justice and Department of Treasury sponsored program. With guidance from the Federal Law Enforcement Wireless Users Group (FLEWUG) and an executive committee that includes Federal, State and local public safety officials, the program is addressing issues facing public safety agencies as they work to improve communications interoperability.

The Coast Guard is working closely with the PSWN Program on several initiatives to establish communications interoperability with other agencies. The following is an update on two public safety projects being implemented in the Washington, D.C. area.

Washington, D.C. Case Study:

To improve and enhance communications interoperability in the Washington, D.C. area, PSWN is implementing a network of ACU-1000 audio switches (provided by JPS Communications) in several strategic locations around the Capital Beltway. These sites will link Washington D.C. area Federal, State and local agencies, and be capable of connecting together the various conventional and trunked communication systems used within the D.C. metro area. The Washington Metropolitan Council of Governments (COG) has endorsed this system.

PSWN is providing the necessary equipment at no cost, including a radio for each participating agency. All that is required from the Coast Guard, for this particular system, is a channel to be programmed into the radio. The radio will remain turned off until needed during an emergency. Initially, the Coast Guard will have a radio at the Arlington and Alexandria, Virginia; District of Columbia; and Rockville, Maryland sites. More sites are planned. Activation of this system will be event driven. If a situation occurs, like the Air Florida crash into the Potomac River, seamless interoperability between responders can be quickly established. Virginia and Maryland State and local police departments, District of Columbia, and several Federal agencies, including U.S. Customs, Secret Service, FBI, Drug Enforcement Agency (DEA), and many others, are connected to these sites.

PSWN, with the help of participating agencies, is developing a Standard Operating Procedure (SOP) for the new system. The SOP will provide details on when the system may be activated, who the participants are, points of contact, who to call to activate the system, etc. PSWN is also preparing a Memorandum of Understanding (MOU), which should be available for review soon. MOUs between Coast Guard Groups and other agencies are usually signed and maintained at the Group level, since they will be the Coast Guard responder to events in their area of responsibility, and a primary user of the system.

Maryland State Police State-Wide ACU-1000 System:

In addition, the Maryland State Police Electronics Systems Division is implementing a statewide system of ACU-1000 switches. They have offered to add a Coast Guard radio to each of their ACU-1000 sites along the Chesapeake Bay and in the Baltimore area. All they need from the Coast Guard is a radio for each site and a frequency.

Other Interoperability Initiatives:

In the New Orleans area the PSWN Program, in concert with the Coast Guard and southeast Louisiana's maritime public safety agencies, is moving forward with a proof-of-concept designed to facilitate improvements in maritime wireless interoperability. This project, in which the Eighth District, Marine Safety Office New Orleans, Electronics Systems Support Detachment (ESD) Baton Rouge and Group New Orleans are key players, is addressing the wide range of activities required to successfully implement and manage a regional interoperability infrastructure. The project will develop an implementation template to be used throughout the Coast Guard, as requirements emerge. The Group New Orleans Rescue 21 system will be connected via landline to two ACU-1000 switches, one in Baton Rouge and one in New Orleans. This system will provide a wireless gateway between the Coast Guard and all other participating public safety agencies.

On the West Coast, the Los Angeles County Sheriff's Department requested a standard Coast Guard (Astro Spectra) mobile radio to be added to their ACU-1000 system. They are anxious to establish interoperability with the Coast Guard in the Los Angeles area. Representatives from Coast Guard Headquarters and the Eleventh Coast Guard District have met with representatives from the LA County Sheriff's Department to discuss this issue.

In the Ninth District, Group Buffalo, in partnership with U.S. Customs, participated in a multi-agency law enforcement operation in the Massena, New York area. As members of the Integrated Border Enforcement Team (IBET), the Coast Guard and U.S. Customs partnered to establish communications interoperability with a dozen other agencies. This was accomplished through the use of a strategically located ACU-1000 audio switch. The operation resulted in successful interdiction of illegal drugs entering the U.S. across the Canadian border.

Policy on Coast Guard Participation in Federal, State and Local Wireless Voice Networks:

The above interoperability initiatives are the ones of which G-SCT is aware. Many State and local agencies are procuring, installing and operating interoperable wireless voice networks. These agencies may request local Coast Guard units to participate in their networks by providing a mobile VHF-FM radio and designating an operational frequency. The requesting agency will typically provide an MOU for signature that documents the agreement between the agency and the Coast Guard.

Preliminary policy on Coast Guard participation in Federal, State and local wireless voice networks will soon be promulgated. This draft policy states that G-SCT encourages Coast Guard participation in another agency's interoperable wireless voice network, where the other agency controls, maintains and operates the network equipment. Units will be responsible for any required maintenance of the provided radio. Units shall notify their Area "t" staffs of such participation via their chain of command. The Office of Communications Systems (G-SCT) is identifying funds to procure

additional radios for participation. Units should contact G-SCT if there is an immediate need. Electronic System Support Units (ESUs) should not deplete their spares in order to provide a radio for participation.

The Office of Communications Systems (G-SCT) discourages procurement of interoperable wireless voice network equipment with local funds. Installation, configuration, maintenance and troubleshooting could easily surpass the expertise of the local unit. The organizational support infrastructure for electronics is not staffed, funded or trained to provide support. Local procurements are done at the unit's risk. Units shall notify their Area "t" staffs via their chain of command of such procurements and planned concept of operations. Operational requirements are being identified and policy is being defined. Templates for MOUs and Standard Operating Procedures (SOPs) are being developed. The Office of Communications Systems (G-SCT) is attempting to secure funding for Coast Guard controlled interoperable wireless voice networks.

Encryption shall not be used on Coast Guard hosted wireless interoperability systems, unless the same level encryption key also protects the communications links to all participating agencies. Authorization must be obtained from the Telecommunication and Information Systems Command (TISCOM) (ISD-3B) prior to Coast Guard issue of encryption keying material to another agency.

Frequency Spectrum Issues:

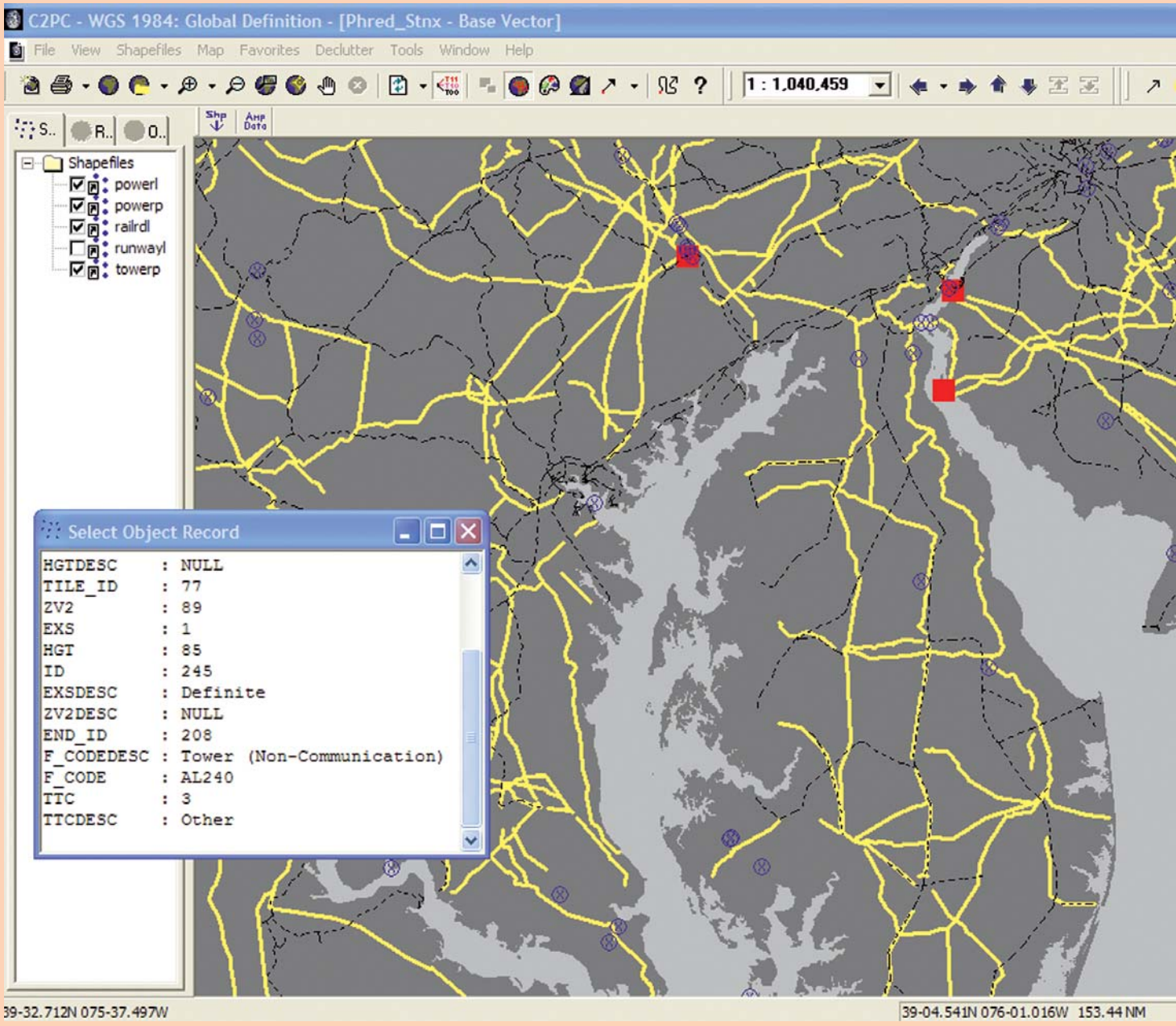
All Coast Guard operated radio systems require spectrum authorization for the frequencies on which they operate, even if the frequencies used are authorized to other agencies. A radio frequency application request with a copy of an MOU or letter of concurrence from the other agency desiring Coast Guard participation in their network should be sent to the Office of Communications Systems Division of Spectrum Management (G-SCT-2) via the chain of command, with a copy to the applicable MLC(t), in accordance with Commandant Instruction M2400.1, Section 4.e.3 (special frequency requests). See http://cgweb.comdt.uscg.mil/g-sct/programs/spectrum/spectrum.htm for further information. Conversely, other agencies desiring authority to operate on Coast Guard wireless voice networks will require similar letters of concurrence or MOUs from the Coast Guard District or Area commanders, in order to obtain their own spectrum authorization. Maritime frequencies (i.e., 156-162 MHz) may only be used for interoperability purposes when at least one party is on board a vessel, or in an emergency.

Commandant Points of Contact:

Units desiring more information regarding Federal/State/local interoperability or being approached by other agencies to participate in their network may contact either Mr. Bob Salmon (G-SCT), (202) 267-2820, rsalmon@comdt.uscg.mil or LCDR Jack Green (G-OCC), (202) 267-1697, jwgreen@comdt.uscg.mil.

C2PC(CG)2.8.1 Takes Shape

by Robert Netsch
Command and Control Engineering Center



It's all about where things are.

The Geographic Information System (GIS) industry is thriving because decision makers from broad government and industry segments need to know what is where. This is not a new notion for the Coast Guard. Consider the benefits that Command and Control Personal Computer (C2PC(CG)) has brought to the search planner for the last four years. The combination of an electronic chart with decision support software (i.e., Search and Rescue (SAR) Tools) creates a picture enriched with very meaningful objects (e.g., datum, search area, etc.). Similarly, many branches of government, and commercial interests, have improved their decision making by using commercial GIS systems to display pertinent spatial data.

So what exactly is spatial data? Spatial data is simply information that has a geographic aspect to it. If the location of something is important, then it can be thought of as spatial data. For example; airports, air traffic routes and air space sectors can all be thought of spatially. Where does spatial data come from? Currently there is no one stop "data warehouse" shop for the Coast Guard, or anyone else, to use or to obtain spatial data. In fact, there are a variety of data formats and a variety of data locations. However, the leading format used in the GIS industry is called Shape. The Shape format was created by ESRI, one of the big GIS vendors. Data in the Shape format is available from government and industry sources. The Shape format itself consists of a set of files that define an object in terms of its physical characteristics (point, line or area), its geographic location (latitude, longitude) and its attributes (data that describe it).

For example, refer to the screen capture located on your left. On the map are four displayed datasets. The yellow lines are power mains. The red squares are power plants. The black dashed lines are rail systems. The blue circle-Xs are tower locations. Notice that one of the tower's attribute data are displayed in the window on the lower left of the graphic. These are all Shape file datasets.

If you have C2PC(CG) experience, you may think it looks a lot like what has been done as overlays for years. Well you are correct. The Shape file interface within C2PC(CG) is a lot like the existing overlay feature. But there is one big difference. Shape data is available from outside of the Coast Guard and is used throughout a broad GIS community.

What this means is more available data. More data means more complete maps. More complete maps mean better situational awareness. Better situational awareness means better decision making … and quite possibly, better data sharing within the Department of Homeland Security. It is likely you will be hearing more about GIS as the Coast Guard formulates its plan on how to best embrace GIS as an enterprise. Until then, think of the displaying of Shape within C2PC(CG)2.8.1 as one small step in that direction.

For additional information on C2PC or the Shape implementation, contact Robert Netsch, C2CEN at (757) 686-2158.

The Personal

by Michael Zemaitis and
CWO Alan Davis
Command and Control Engineering Center

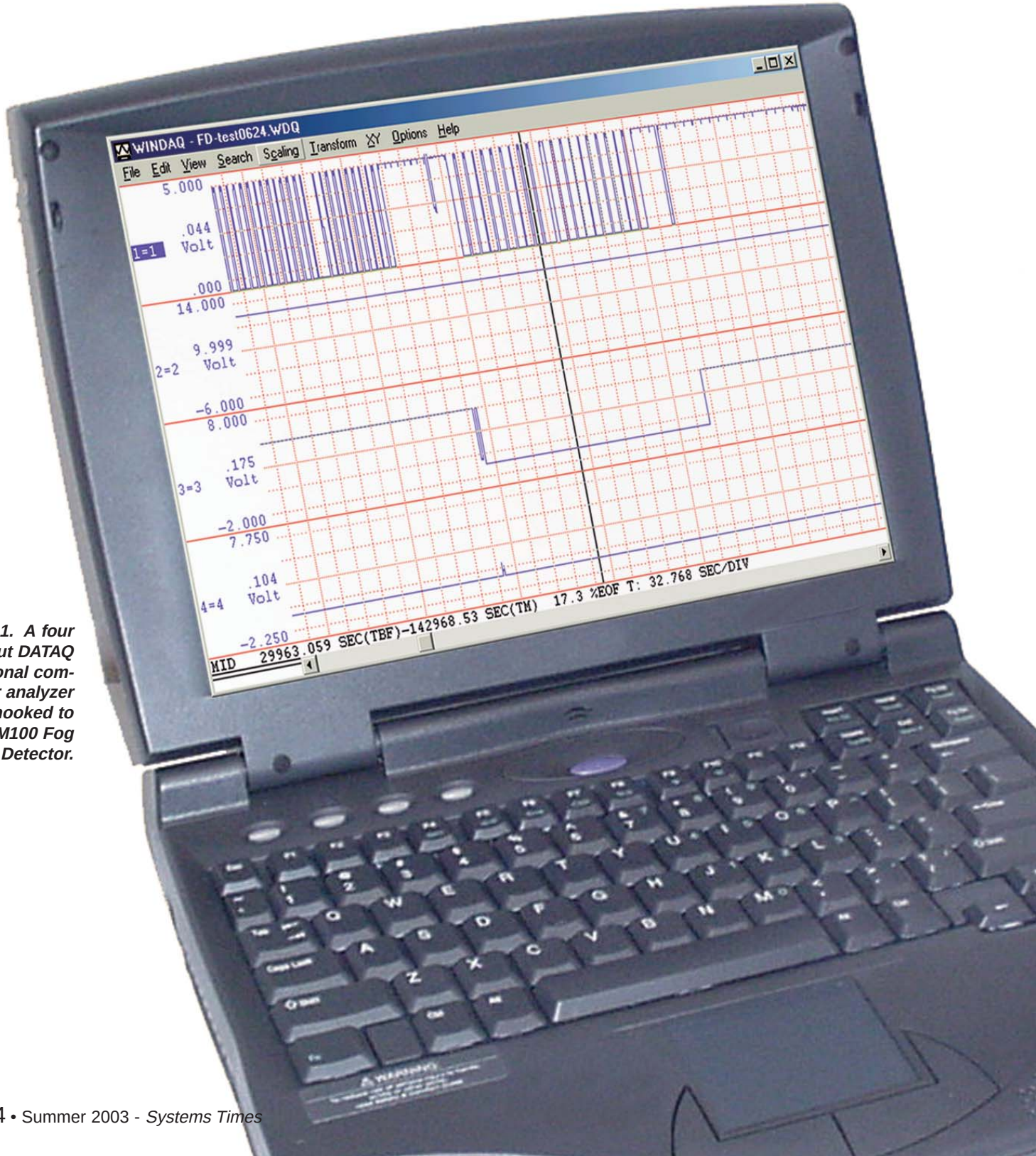


Figure 1. A four input DATAQ personal computer analyzer hooked to VM100 Fog Detector.

Computer as a Troubleshooting Tool

Most people use the personal computer for office automation and communication tasks. However, as the personal computer grows in storage and processing capability it has become an increasingly attractive tool for engineering tasks. In the past, engineers usually required expensive test equipment for measuring events in magnitude and time. Examples of this equipment are commercial power analyzers and time-domain reflectometers. Engineers also used the personal computer to gather information, however, a "jury-rig" at the serial or parallel input was needed and it could only be used for one specific test. Today, recent innovations in commercial-off-the-shelf interface units combined with the personal computer allow engineers to cost-effectively measure waveforms, logic states and analog inputs. These measurements are stored on the computer and can easily be retrieved for analysis. The computer can even display the information in a time domain graph.

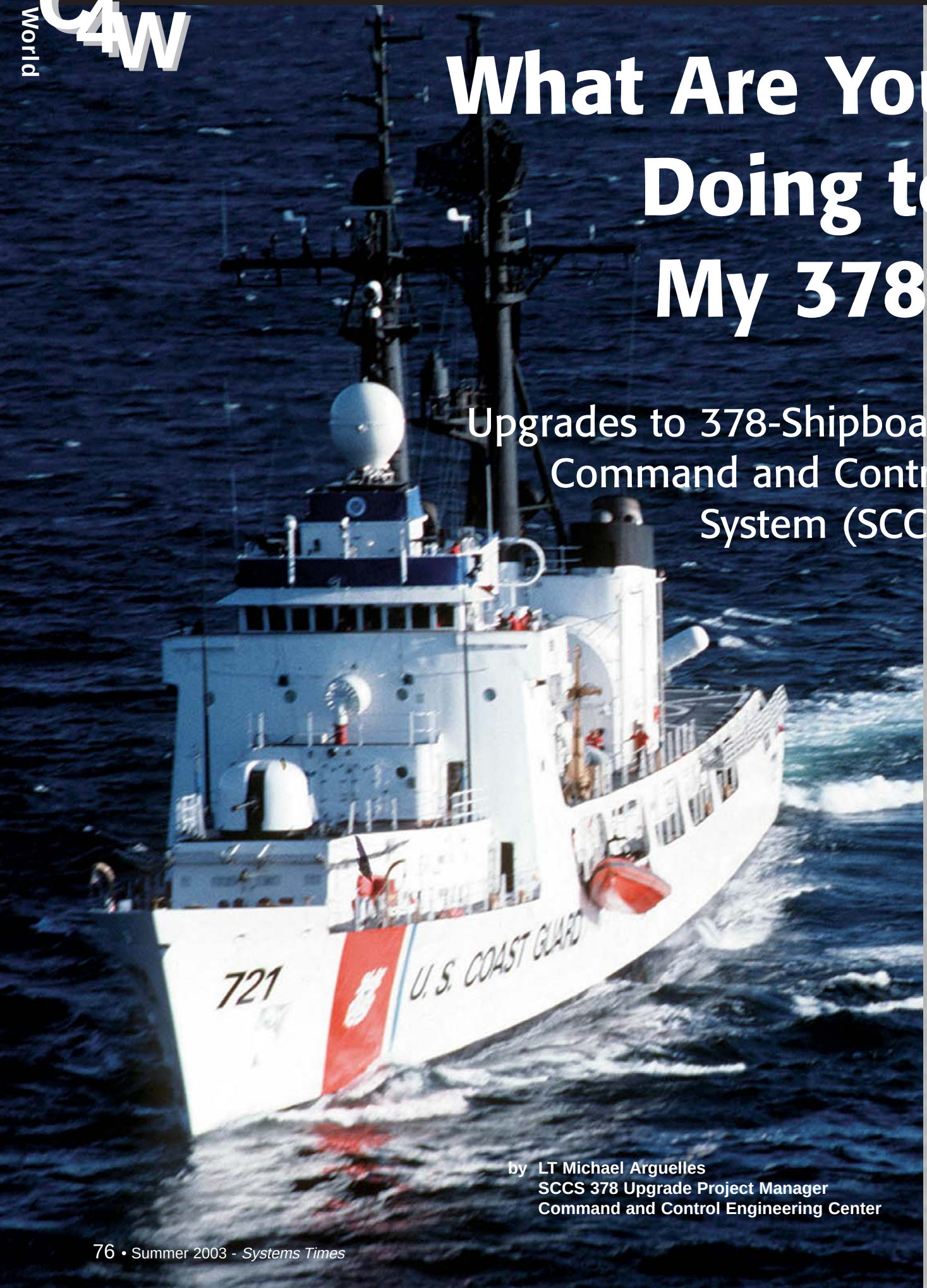
The United States Coast Guard Command and Control Engineering Center's (C2CEN) hardware engineer CWO Alan Davis was stumped by a reported failure in the VM100 fog detector. At a certain point the VM100 would set a "Failure Alarm," but the foghorn was not turned on. This did not follow proper program procedure. In normal operation, if the "failure alarm" latches, the foghorn should immediately energize. CWO Davis ordered a free hardware evaluation interface device from DATAQ Instruments in 2001 to help determine the cause of the failure. Using a personal computer and the interface device, the VM100 fog detector was monitored at the "failure on" point, the "failure relay" point, the "lens heater on" point and the "lens heater off" point of the interface board (See Figure 1). The reasoning behind using these points is that the VM100 lens heater is programmed to pulse on and off when the detector senses a decrease in visibility range. This subroutine was added to the VM100 when it was discovered that dew, or condensed moisture, could accumulate on the lens in clear weather from temperature change enough to reach the "dew point." This would mistakenly turn on the foghorn in early morning or late evening hours in "clear" weather. The information gathered from the computer and interface device led C2CEN engineers to discover that there was a previously undetected subroutine in the program that would "test" the lens heater of the VM100. This subroutine would turn on the lens heater circuit and then turn it off to evaluate if the voltage drop across a voltage divider was correct, which verified that the lens heater was working. Because one subroutine was turning the heater on and another subroutine was pulsing the heater (in particular, turning it off for part of the pulsing cycle) the failure alarm was set. However, because the pulsing cycle would immediately turn the heater back on again the failure alarm routine did not have time to complete and the foghorn never energized. This event happened at such a fast and infrequent rate that without the interface unit and personal computer many additional hours would have been needed to find the problem.

With the success of using this DATAQ evaluation package, C2CEN's Short Range Aids to Navigation team invested in a much larger DATAQ personal computer analyzer for use with the Range Light Controller program. They chose the DATAQ DI 700 because it allows for input and output monitoring of eight channels in and eight channels out. This is a great improvement because many commands from a computer system that controls Range Lights are on the output channels of optical isolators.

If you are interested in exploring the field of computer analysis using a DATAQ you can visit the DATAQ Instruments web site at www.dataq.com. For additional information, contact CWO Al Davis at (757) 686-4090.

What Are You Doing to My 378?

Upgrades to 378-Shipboard Command and Control System (SCCS)



by LT Michael Arguelles
SCCS 378 Upgrade Project Manager
Command and Control Engineering Center

INTRODUCTION

By late 1999, it had become clear to the Command and Control Engineering Center (C2CEN) that growing technological demands necessitated an upgrade of the Shipboard Command and Control System (SCCS) on the Coast Guard's High Endurance Cutters (WHECs) and Medium Endurance Cutters (WMECs). The crux of the change would be a switch from the current Hewlett-Packard (HP) Operating System (OS) to a primarily Sun infrastructure and OS.

The move to Sun was predicated by the fact that the Sun OS provided the best environment for the COMmand Display Control-Integrated Navigation System (COMDAC-INS) -- the soon-to-be standard for paperless navigation on selected platforms in the Coast Guard (CG) and U.S. Navy. The superior performance of the Defense Information Infrastructure Common Operating Environment (DII COE) 3.4/4.X Joint Mapping Tool Kit (JMTK) in a Sun environment, and the lower cost of the Sun hardware, also contributed to the CG's decision. Soon afterwards, the Space and Naval Warfare System's (SPAWAR's) Global Command and Control-Maritime (GCCS-M) office decided that it, too, would adopt a Sun baseline. This ensured interoperability and the exchange of software between CG and U.S. Navy.

The upgrade increases SCCS-378 functions. Chief among these innovations are new software tools for electronic navigation on the bridge and for secure communications from the desktop in the Combat Information Center (CIC). The upgrade will introduce paperless navigation to the 378 cutters. Moreover, the upgrade brings the CG one step closer to the objective of creating a "single fleet" -- a single architecture that is operable across all SCCS CG platforms. Because upcoming COE versions promise increased data manipulation and tracking capabilities, the upgrade represents a quantum leap in the area of vessel operations and information sharing for the CG.

CURRENT SYSTEM

The present SCCS system integrates sensor, display, communications and advanced computing technology into a contemporary CIC architecture. The system is based upon the Navy Tactical Command System - Afloat (NTCS-A) and takes advantage of open systems architecture using Commercial-off-the-Shelf (COTS) and Government-off-the-Shelf (GOTS) components. The configuration's central unit is the Navy's Tactical Advanced Computer 3 (TAC-3). These machines are arranged in a workgroup network configuration and run the Joint Maritime Command Information System (JMCIS) HPUX operating system.

SCCS-378 interfaces with a number of sensors and subsystems used on CG vessels, including Radar Distribution and Display System (RADDS), SPA-25G radar indicators; StatNet; Gyro compass, speed log; Long-Range Navigation (LORAN) -C; Global Positioning System (GPS); Differential Global Positioning System (DGPS); Officer in Tactical Command Information Exchange system (OTCIXS); AN/SPS-73 radar; and LINK-11.

NEW HARDWARE

The new architecture is a client/server configuration running the Sun Unix version of the COE on the Sun Solaris operating system. The upgrade configuration calls for removing three existing TAC-3 HP computers from the CIC console, replacing these with a rack containing seven clients, and installing the system server into the SCCS console. The new machines provide five CIC positions and two bridge positions. Major system components include: a Concorde T1405/Solaris workgroup server; GulfCoast SparcStar servers; 18" arm- and rack-mount, flat-panel monitors; Cisco switches; and a terminal server (see Figures 1, 2 and 3 on next page).

COMDAC-INS

The upgrade will replicate the current functionalities of SCCS-378 4RP, utilizing the Sun OS instead of the current HP system. New software tools will add essential navigation and collision avoidance functions to SCCS.

Figure 1. SCCS Rack.

Figure 2. Console Position.

Figure 3. Navigator Position.

Foremost among these innovations is the COMDAC-INS. COMDAC-INS is designed as a collection of COE segments that combine to form an integrated navigation system application. Its introduction on the 378s allows the cutters to retain conventional sea-charting functions while adding new capabilities to their navigational suite.

Use of COMDAC-INS signals the end of paper navigation. The system makes use of both National Oceanic and Atmospheric Administration (NOAA) raster and National Imagery Mapping Agency (NIMA) Digital Nautical Chart (DNC) vector electronic charts, provides advanced navigator reports and calculations, and displays enhanced radar overlay. It also has the ability to layer DNC and BSB charts in the same window, to execute point-and-click queries of the DNC, and to automatically populate the Standard Navigation Report with Next Hazard and Next Aid along the active track line. It will have Geographic Information System (GIS) qualities like point and click query on the electronic chart, hazard alarms and grounding avoidance. Wherever possible, the system conforms to standards set by the International Electrotechnical Commission (IEC), the National Marine Electronics Association (NMEA) and the Radio Technical Commission for Maritime Services (RTCM).

An earlier generation of COMDAC-INS already is used on all Medium Endurance (210s and 270s) Coast Guard cutters, COMDAC-INS is responsible for earning the Coast Guard its reputation as the “Electronic Navigation Experts.” The system was selected to be the U.S. Navy's Primary Electronic Chart and Navigation System and, as such, a version of COMDAC-INS is used on several selected platforms of U.S. Navy destroyers and aircraft carriers. With plans underway to put the cutting-edge navigation system on the CG's 110' Island Class Patrol Boats beginning in 2003, and on more than 200 Navy surface ships over the next five years, use of COMDAC-INS is unlikely to end soon.

OTHER SOFTWARE

The upgrade includes the addition of the Command Display and Control Automatic Radar Plotting Aids (COMARPA) segment to the SCCS suite (see Figure 4). COMARPA integrates with the AN/SPS-73 to allow access to the radar system's functions. Specifically, the segment provides an International Maritime Organization (IMO) ARPA-compliant Graphical User Interface (GUI) to SCCS-378 operator positions, allowing full Level 1 (L1) control of SPS-73 radar. In the pre-upgrade configuration, AN/SPS-73 functionalities were available only at the Tabletop Operating Position (TBOP) and the Stand-alone

Operating Position (SAOP). COMARPA allows unprecedented access to these functions from every workstation on the SCCS console.

COMDAC Remote (COMREM) adds yet another vital capability to SCCS. This Windows-based program operates remotely, displaying tactical and navigation data from the various SCCS COE segments without the human interface provided by the primary COMDAC system. Users access a range of ship's location parameters, including Ownship and Active Trackline data and Standard Navigation reports. This information can be viewed on a series of user-selectable monitors. COMREM offers functionalities such as Status Board (an electronic version of a traditional Status Boards operation), Closest Point of Approach (CPA) and Command and Control Personal Computer (C2PC) Electronic Charting. COMREM's tracks sub-screen allows users to generate and/or view target track information from the Tactical Management System (TMS), have the information processed and then send the data to the SPA-25 G radar indicator if required.

Figure 4. COMARPA on Console.

In addition to the navigational tools already mentioned, new versions of the following COE segments have been developed so that the current version of these segments are compatible with the new Solaris environment:

- ❏ Versamodule Eurocard Bused (VME) Interconnecting Group Controller (VIGC)
- ❏ Officer in Tactical Command Information eXchange System (OTCIXS)
- ❏ LINK 11

CONCLUSION

The objective of the SCCS-378 upgrade is to entirely upgrade and replace SCCS-378 4RP with a next generation system. The upgrade system will feature the cost-effectiveness and flexibility of the Sun Solaris UNIX OS, along with added mission capabilities. New, selectable displays on the Bridge and in CIC will allow unprecedented access to the tactical and navigational functions aboard ship. Shipboard operators will enjoy the advantages of viewing a total navigation/tactical/surface picture at the click of a button.

Above all else, the SCCS-378 upgrade will bring the CG 378' cutters into the era of paperless navigation. COMDAC-INS will have a profoundly positive impact on vessel operations and information acquisition and transfer. The effort will yield a more powerful, technologically capable Coast Guard with an unparalleled ability to participate in large, multi-unit operations around the world.

LCDR Thomas Moriarty is the 2003 Coast Guard Engineer of the Year

LCDR Thomas Moriarty, Executive Officer, Naval Engineering Support Unit Portsmouth, Virginia, is the Coast Guard Engineer of the Year for 2003. He was selected from a group of 13 outstanding military and civilian engineering nominees throughout the Coast Guard.

LCDR Moriarty is one of very few who ever advanced from Petty Officer to Lieutenant Commander and earned both a masters degree and professional engineer status. He is a recognized leader in Reliability Centered Maintenance who directly influenced the trend toward integration of vibration analysis, laser alignments and inspections using bore scope, ultrasonic and thermographic equipment. He presented compelling and persuasive justification for expanding predictive maintenance and condition based maintenance before key Coast Guard decision makers. As a direct result, several time-based maintenance actions and routine open and inspect procedures were modified, saving hundreds of labor hours and countless hardware dollars per year. For example, through relentless efforts, the cutter vibration analysis program spread from one cutter class to another, reaping invaluable resource saving benefits.

With a passion for leveraging technology, LCDR Moriarty put user-friendly advanced technology tools in the hands of the technicians. In turn, they efficiently inspected and evaluated machinery without labor-intensive high-risk disassembly and re-assembly. As a teacher, mentor and supervisor of five port engineers, supporting over 30 cutters homeported between New York and North Carolina, he shared extensive knowledge of machinery/hull repairs, propulsion shaft and bearing alignment procedures, dry-docking procedures, quality assurance techniques and efficient administration of major repair contracts. Excelling as Executive Officer for a command of over 100 personnel and a budget near 2.6 million per year, LCDR Moriarty effectively set goals, assigned tasks and motivated the workforce. He was rightly credited in 1999 with increasing on-time completion rates for cutter repair contracts by 10 percent, making a clear positive impact on the 19 million annual repair budget.

LCDR Moriarty was recognized for his efforts during an awards ceremony hosted by the National Society of Professional Engineers (NSPE) on 20 February 2003 at the National Press Club, Washington, DC. LCDR Moriarty was accompanied by his wife, Martha, and their two children, Samantha and Nathan, during a morning visit with the U.S. Coast Guard Commandant, Admiral Thomas H. Collins, and the Assistant Commandant for Systems, RADM Bert Kinghorn, where each congratulated him for his selection and a job well done. RADM Kinghorn accompanied the Moriartys to the NSPE Luncheon where he presented the LCDR with the Coast Guard Engineering of the Year Plaque.

The luncheon honors and recognizes the contributions of Federal Government engineers for their achievements in engineering to the nation. The luncheon honors federal engineers from both civilian and military agencies and is one of the highlighted events during National Engineers Week, 17-21 February 2003. Congratulations to LCDR Moriarty and all others nominated for this years “Coast Guard Engineer of the Year.” ST

The Commandant's ENVIRONMENTAL STEWARDSHIP CHALLENGE

Long recognized as *America's Maritime Guardians*, the United States Coast Guard has an obligation to safeguard our nation's precious environment and natural resources. As an enforcer of environmental laws, we are uniquely positioned to exhibit strong leadership in environmental stewardship. Entrusted with this responsibility, I direct every Coast Guard member to recognize his or her individual role in enhancing mission performance through better operational planning and environmental management.

The American public expects us to protect the homeland in a manner consistent with our nation's environmental values. President George W. Bush said, "*Stewardship is the calling of government, and it is the calling of every citizen.*" As citizens and as members of the Coast Guard, we will rise to that challenge and be leaders in environmental stewardship. We will meet the President's plan of "*Greening the Government Through Leadership in Environmental Management*" by:

a) **INSTITUTING** a program of integrated environmental management systems at our larger units by 2006, supported by senior management commitment and ensuring that environmental considerations are made part of day-to-day activities and decision-making;
b) **INCORPORATING** rigorous environmental compliance programs that emphasize pollution prevention, which focus on front line acquisition and source reduction by establishing baselines and reducing use of specific designated hazardous materials by 50% by 2006;
c) **PRIORITIZING** funding and resources for mission and support-related environmental needs; and,
d) **PROMOTING** organizational Environmental Leadership and Stewardship at every level of the Coast Guard planning process.

I commit Team Coast Guard to ensure that environmental considerations are incorporated into all future actions and missions. Environmental Stewardship is essential to sustain the public's trust in the Coast Guard as a premier Homeland and Maritime Security agency. I challenge each Coast Guard employee, to make a strong commitment to excellence in environmental stewardship.

Thomas H. Collins

THOMAS H. COLLINS
Admiral, U.S. Coast Guard
Commandant

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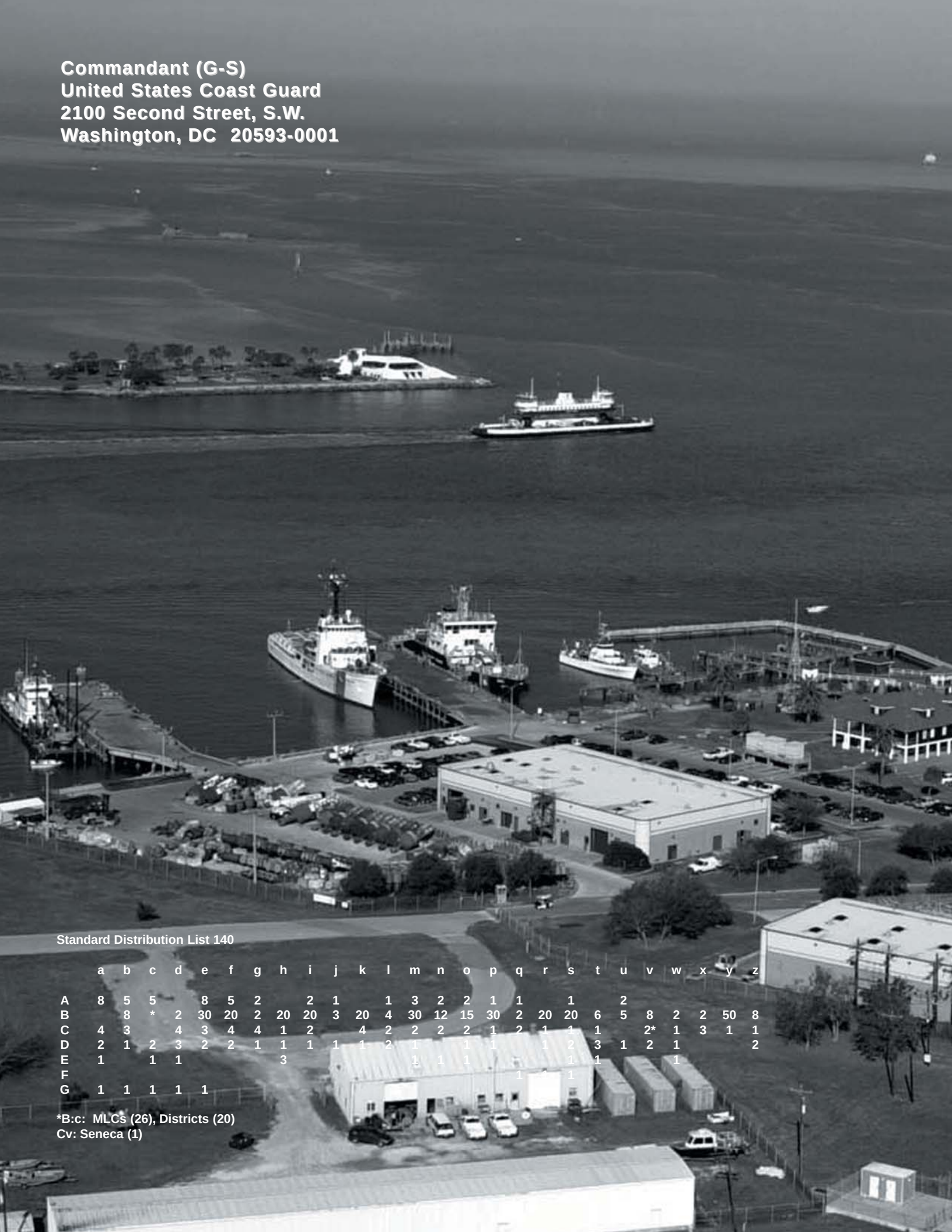

Standard Distribution List 140

	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z
A	8	5	5		8	5	2		2	1		1	3	2	2	1	1		1		2					
B		8	*	2	30	20	2	20	20	3	20	4	30	12	15	30	2	20	20	6	5	8	2	2	50	8
C	4	3		4	3	4	4	1	2		4	2	2	2	2	1	2	1	1	1		2*	1	3	1	1
D	2	1	2	3	2	2	1	1	1	1	1	2	1		1	1		1	2	3	1	2	1			2
E	1		1	1				3					1	1	1				1	1			1			
F																	1	1	1							
G	1	1	1	1	1																					

***B:c: MLCs (26), Districts (20)**
Cv: Seneca (1)